Honeywell

XYR 301X Serial I/O Module

User's Manual

34-XY-25-23
Version 1
5/1/2008

Notices and Trademarks

Copyright 2008 by Honeywell International Inc.
Version 1 May 1, 2008

While this information is presented in good faith and believed to be accurate, Honeywell disclaims the implied warranties of merchantability and fitness for a particular purpose and makes no express warranties except as may be stated in its written agreement with and for its customers.

In no event is Honeywell liable to anyone for any indirect, special or consequential damages. The information and specifications in this document are subject to change without notice.

Honeywell, PlantScape, Experion PKS, and **TotalPlant** are registered trademarks of Honeywell International Inc.

Other brand or product names are trademarks of their respective owners.

Honeywell International

Process Solutions

2500 West Union Hills

Phoenix, AZ 85027

1-800 343-0228

About This Document

This document describes preparation, operation and maintenance of the XYR 301X Wireless I/O extensions. Mounting, installation and wiring are covered in other documents.

Honeywell does not recommend using devices for critical control where there is a single point of failure or where single points of failure result in unsafe conditions. XYR3000 is targeted at open loop control, supervisory control, and controls that do not have environmental or safety consequences. As with any process control solution, the end-user must weigh the risks and benefits to determine if the products used are the right match for the application based on security, safety, and performance. Additionally, it is up to the end-user to ensure that the control strategy sheds to a safe operating condition if any crucial segment of the control solution fails.

Revision Information

Document Name	Document ID	Version Number	Publication Date
XYR 301X Serial I/O Module User`s Manual	34-XY-25-23	1	5/1/2008

References

The following list identifies all documents that may be sources of reference for material discussed in this publication.

Document Title
Getting Started with Honeywell OneWireless solutions
XYR3000 MSG
How to build an XYR3000 system

Terminology

The following acronyms are used in the document.

Acronyms	Model numbers
XYR300X	XYR3001, XYR3002
XYR301X	XYR3011, XYR3012, XYR3013
XYR300G-X	XYR300G-M, XYR300G-E

Support and Contact Information

United States and Canada

Contact: Honeywell Solution Support Center
Phone: 1-800 822-7673. In Arizona: 602- 313-5558
Calls are answered by dispatcher between 6:00 am and 4:00 pm Mountain Standard Time. Emergency calls outside normal working hours are received by an answering service and returned within one hour.
Facsimile: (602) 313-3293
Mail: Honeywell TAC, MS P13
2500 West Union Hills Drive
Phoenix, AZ, 85027

World Wide Web

Honeywell Solution Support Online:
http://www.honeywell.com/ps

Elsewhere

Call your nearest Honeywell office.

Training Classes

Honeywell Automation College:
http://www.automationcollege.com

Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	ATTENTION: Identifies information that requires special consideration.
	TIP: Identifies advice or hints for the user, often in terms of performing a task.
CAUTION	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
	CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. **CAUTION** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	WARNING: Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death. **WARNING** symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	WARNING, Risk of electrical shock: Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible.
	ESD HAZARD: Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices.
	Protective Earth (PE) terminal: Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	Functional earth terminal: Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements.
	Earth Ground: **Functional earth connection.** NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.
	Chassis Ground: Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.

CONTENTS

1 OVERVIEW 1

1.1 MODULE TYPES AND FEATURES 2
1.1.1 Digital inputs / outputs 2
1.1.2 Pulsed outputs 3
1.1.3 Pulsed inputs 3
1.1.4 Analog inputs 4
1.1.5 Analog outputs 4
1.1.6 Communications 5

2 INSTALLATION 6

2.1 GENERAL INSTALLATION 6
2.1.1 Power Connection 6
2.1.2 Address Switches 6
2.2 SIGNAL CONNECTIONS 8
2.2.1 Digital Inputs (and Pulsed Inputs) 8
2.2.2 Digital Outputs (and Pulsed Outputs) 9
2.2.3 Analog Inputs 9
2.2.4 Analog Outputs 13

3 CONFIGURATION 16

3.1 ADD A RADIO MODULE TO CONNECT THE XYR 301X TO THE RADIO NETWORK. 16
3.2 ADD THE SERIAL MODULE 16

4 HARDWARE CONFIGURATION 19

4.1 CONNECTING TO THE XYR 301X MODULE 19
4.2 CONFIGURATION COMMON TO ALL MODULES 20
4.2.1 Communications 20
4.2.2 Pulsed outputs 21
4.3 XYR 3011 I/O CONFIGURATION 22
4.3.1 Pulsed Inputs 22
4.4 XYR 3012 I/O CONFIGURATION 23
4.4.1 Voltage input 23
4.4.2 Current input 25
4.5 XYR 3013 I/O CONFIGURATION 28
4.5.1 Voltage output 28
4.5.2 Current output 29

5 OPERATION 31

5.1 XYR 3011 I/O MODULE 31
5.2 XYR 3012 I/O MODULE 32
5.3 XYR 3013 I/O MODULE 34
5.4 HEXADECIMAL REPRESENTATION OF VOLTAGE AND CURRENT LEVELS 36

APPENDIX A. MODBUS ADDRESS MAP 37

A.1. XYR 3011 I/O 37
A.2. XYR 3012 I/O 39
A.3. XYR 3013 I/O 41

APPENDIX B. MODBUS FUNCTIONALITY 43

APPENDIX C. COMMS RECOVERY 44

APPENDIX D. SPECIFICATIONS 46
APPENDIX E. RS232 WIRING 48

Tables

Table 1-1: Summary of XYR 301X module types and I/O. 2
Table 5-1: Hex representation of voltage and current levels. 36
Table B-1: Supported Modbus functions and limitations for XYR 301X modules. 43
Table D-1: XYR 301X Specifications. 47
Table D-2: XYR 301X module types and I/O. 47

Figures

Figure 1-1: XYR 301X unit with significant parts labelled. 1
Figure 2-1: Several XYR 301X units connected to a master. 6
Figure 2-2: Power and RS485 connector. Connect 12-15VDC to '+' and earth to '-'. Connect RS485 to B and A. 6
Figure 2-3: Address switches. The address shown is 01. 7
Figure 2-4: RS485 multi-drop connection and termination (only use external termination for the master if it does not have internal termination). 7
Figure 2-5: Connection of digital inputs. 8
Figure 2-6: Connection of digital outputs. 9
Figure 2-7: Connection for single-ended current inputs. Transducers may be externally powered or powered by the XYR 301X +24V loop supply. 10
Figure 2-8: Connections for differential current inputs. 11
Figure 2-9: Connection for differential voltage input mode. 12
Figure 2-10: Connection for single-ended voltage input. 13
Figure 2-11: Connection for current source output. 14
Figure 2-12: Connection for current sink output. 14
Figure 2-13: Connection for voltage output configuration. 15
Figure 3-1: Configuration of XYR 301X modules using Honeywell Configuration Utility. 17
Figure 3-2: Select the unit type. 17
Figure 4-1: Main configuration screen. 19
Figure 4-2: Communications configuration screen. 20
Figure 4-3: Pulsed outputs setup page for a XYR 3011 I/O. The pulsed outputs are available on all models. 21
Figure 4-4: Pulse inputs setup. Only available on a XYR 3011 I/O module. 22
Figure 4-5: Setup page for single-ended voltage input. 23
Figure 4-6: Setup page for differential voltage input. 24
Figure 4-7: Setup page for single-ended current input. 25
Figure 4-8: Setup page for differential current configuration. 26
Figure 4-9: Voltage output setup page. 28
Figure 4-10: Current output setup page. 29
Figure 5-1: I/O terminal block for XYR 3011 I/O. 31
Figure 5-2: Check the operation of the XYR 3011 I/O module using the DIO Check page. 31
Figure 5-3: I/O terminal block for XYR 3012 I/O. 32
Figure 5-4: Check the operation of the XYR 3012 I/O module with the AIN Check page. 33
Figure 5-5: I/O terminal block for XYR 3013 I/O. 34
Figure 5-6: Check the operation of the XYR 3013 I/O module using the AOT Check page. 34
Figure E-1: Wiring for RS232 cable for PC-XYR 301X communications. 48

1 Overview

The Honeywell XYR 301X modules are designed to provide I/O expansion for other Honeywell products like XYR 300X modules. The XYR 301X modules support the Honeywell E-Series protocol, and communicate serially via RS232 or RS485. Configuration is done via the Honeywell E-Series configuration utility.

The XYR 301X modules also support MODBUS protocol. They may be used as a MODBUS slave with any 3rd-party MODBUS device, or with the Honeywell or XYR 300X modules using MODBUS. They support both MODBUS ASCII protocol, and serial un-signed MODBUS RTU, also known as "MODBUS binary". The Modbus slave address of the XYR 301X is selected via two rotary switches on the bottom panel of the case.

All XYR 301X models provide digital inputs and outputs. Specific models provide analog inputs or analog outputs. Pulsed inputs and pulsed outputs are also available. Several modules may be connected to one master, allowing any combination of I/O types.

Figure 1-1 shows a diagram of a XYR 301X module with parts labelled.

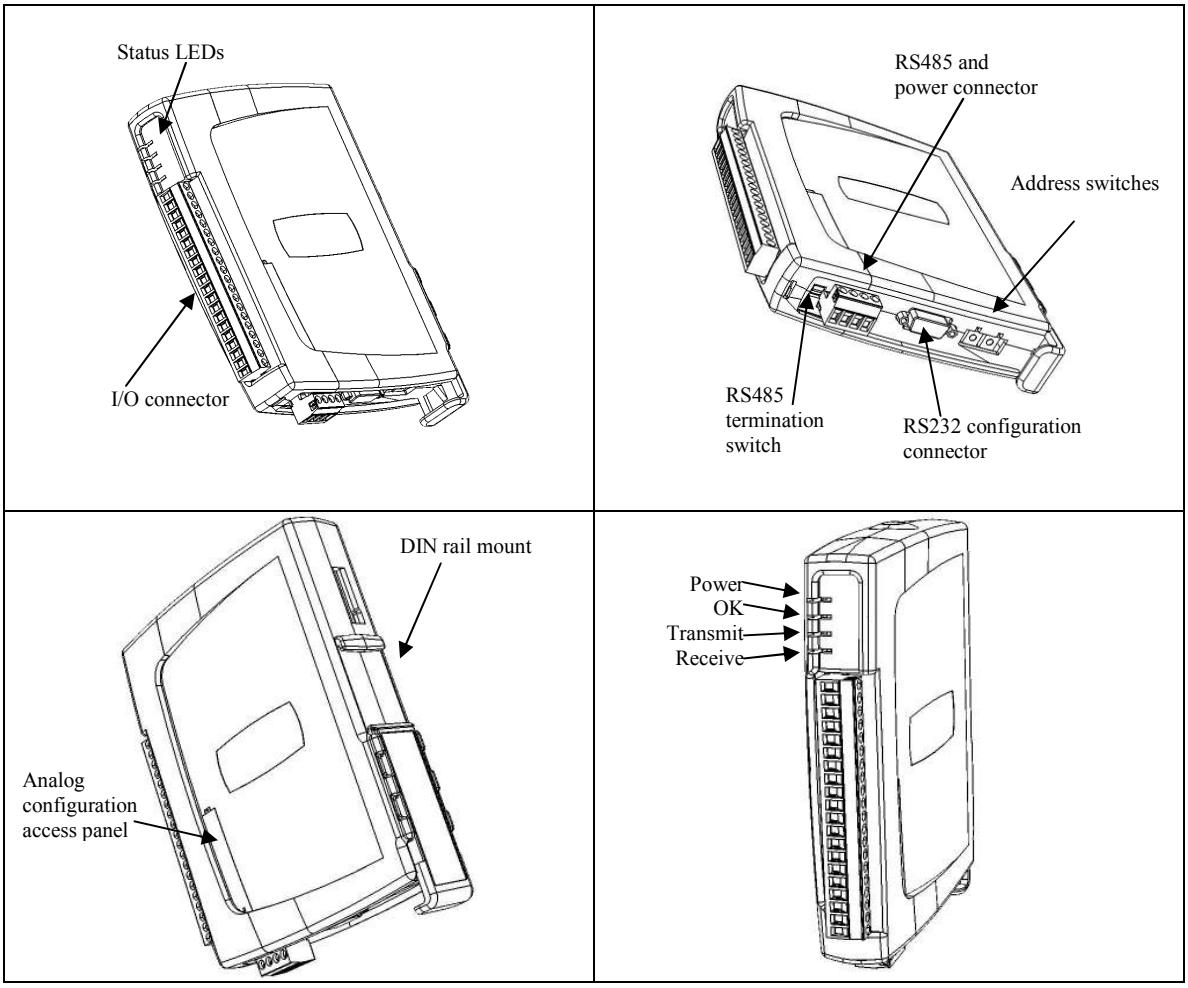

Figure 1-1: XYR 301X unit with significant parts labeled.

Two ports allow configuration and communications on the XYR 301X. The RS232 port is intended for configuration. The RS485 port allows the unit to be in a multi-drop configuration.

Overvoltage protection and supply monitoring is provided to minimize the risk of failure due to faulty connections or supply surges.

1.1 Module types and features

The module types and I/O are summarized in Table 1-1.

XYR 301X	-11	-12	-13
Digital inputs/outputs	16	8	8
Pulse outputs	8	8	8
Pulse inputs	4	-	-
Analog inputs	-	8	-
Analog outputs	-	-	8

Table 1-1: Summary of XYR 301X module types and I/O.

1.1.1 Digital inputs / outputs

Each digital I/O channel on the XYR 301X modules can act as either an input or an output. The input/output direction does not need to be user configured.

Digital inputs are suitable for voltage-free contacts, or NPN-transistor switch devices.

Digital outputs are open-collector transistor outputs, able to switch loads up to 30VDC, 200mA.

If you have wired an input/output channel as an input, it is recommended that you do not write values to it as an output. No electrical damage will occur if you attempt to use a channel wired as an input as an output, or vice-versa, however the I/O system will not operate correctly.

We recommend that the required digital inputs be assigned consecutively from channel 1. Then use the remaining channels as digital outputs.

1.1.2 Pulsed outputs

The first eight digital channels on each XYR 301X module can be used as pulse outputs. The maximum output frequency is 100Hz.

A pulse output on the XYR 301X will output the number of pulses equal to the register value sent by the master. When the master sends a new register value, the XYR 301X will output additional pulses until the output count is the same as the new value.

Three register values are associated with creating each pulsed output:

- *The Count keeps a tally of how many pulses have been output - this is a 16-bit register and overflows to 0.*
- *The Target is set by the master, and is the trigger for pulses to be created. The digital channel outputs pulses until the Count value reaches the Target value. If the Target register is set to 0, the pulses stop and the Count register is cleared.*
- *The Update Time is the interval in which the XYR 301X expects to receive updates to the Target value. The module will output enough pulses for the Count to reach the Target within the update time. The output pulse rate is determined by the update time, and the difference between the count and the target.*

If the calculated pulse rate is more than the maximum rate (100Hz), the XYR 301X will output pulses at the maximum rate. At the end of the update time, the count value will be less than the target. The XYR301X will then calculate the new required pulse rate for the next update period, based on the difference between Count and Target values.

If the calculated pulse rate is greater than around three times the maximum rate, pulses are not output. The Count value will be set to the value of the Target without any pulses output. Pulses will be output again when the calculated pulse rate falls within the maximum possible rate.

1.1.3 Pulsed inputs

The first four digital channels on the XYR 3011 I/O module can be used as pulsed inputs. The maximum input pulse frequency is 1KHz.

The pulse input channel calculates two register variables, each of which can be read by the Modbus master.

- The *Pulse Count* is a count of the pulses detected on the channel since the XYR 301X powered up. The pulse input counts are 32-bit values (2 x 16-bit registers, a low and a high register), and wrap around to zero on overflow.
- The *Pulse Rate* is a measure of the rate of pulses detected on the channel. The pulse rate value is decimal 16,384 (hex 4000) for zero rate and decimal 49,152 (hex C000) for the *maximum rate* configured by the user. These zero and maximum values are the same as 0% and 100% used for analog values. (See section 5.4 for hex to decimal conversion.)

The maximum pulse input rate is set during configuration. The value is in pulses per minute and is limited to 60000 (1KHz), the maximum rate capable of the module.

1.1.4 Analog inputs

The analog inputs on the XYR 3012 I/O can be connected as either grounded single-ended inputs or as floating differential inputs. The XYR 3012 I/O has eight grounded inputs or four floating inputs.

- Grounded single-ended inputs connect between the AIN terminal and the GND terminal.

- Floating differential inputs each take up two terminals. There are four differential pairs on the XYR 3012 I/O: [AIN1-AIN2], [AIN3-AIN4], [AIN5-AIN6], [AIN7-AIN8]. For example, the first input is connected to terminals AIN1 (positive) and AIN2 (negative).

The two types of input cannot be mixed - all inputs must be either "grounded" or "floating".

Inputs can also be selected as mA current, or voltage input - all inputs must be the same, either all current or all voltage. The scale of each analog input is chosen during hardware configuration, with scale options as follows:

Voltage input scale options: [0 to 5V], [0 to 10V], [1 to 5V]
Current input scale options: [0 to 10mA], [0 to 20mA], [4 to 20mA]

For compatibility with E-Series modules, 4-20mA current is recommended. See section 4.4 for more information on compatibility.

The values on the analog input are decimal 16,384 (hex 4000) for minimum signal (0%) and decimal 49,152 (hex C000) for maximum (100%).

The analog channel will measure over-scale, up to 150% which will have value 65,536 (hex FFFF). For 4-20mA signals, the channel will measure under-scale down to 0mA which has a value of 8,192 (hex 2000). (See section 5.4 for hex to decimal conversion.)

The XYR 3012 I/O provides a 24V analog loop supply ("ALS") for powering analog loops.

1.1.5 Analog outputs

The XYR 3013 I/O has eight analog output channels and can be configured to output voltage or current. For current signals, "source" or "sink" can be selected. The scale of each analog output is specified during configuration, with scale options as follows:

Voltage output scale options: [0 to 5V], [0 to 10V], [1 to 5V]
Current output scale options: [0 to 10mA], [0 to 20mA], [4 to 20mA], source or sink

- Voltage outputs are measured with respect to the ground terminal.
- Current source outputs are measured with respect to the ground terminal.
- Current sink outputs are measured with respect to the 24V "ALS" terminal.

Writing to the output register by the master produces the analog output. Minimum to maximum signals (0 – 100%) are produced by register values from decimal 16,384 to 49,152 (hex 4000 - C000). (See section 5.4 for hex to decimal conversion.)

The analog channel can output over-scale, up to 150% corresponding to register value 65,536 (hex FFFF). For 4-20mA signals, the channel can output under-scale down to 0mA from a register value of 8,192 (hex 2000) or less. Note that the over-scale output is limited by the maximum levels capable of the XYR301X module (12V or 24mA).

1.1.6 Communications

The XYR 301X modules have two communication ports: RS232 and RS485. The RS485 port communicates using E-Series protocol. Both ports support Modbus protocol.

The RS232 port is intended for configuration. The RS485 port is intended for normal operation and can be used in a multi-drop setup.

There are two address switches on the base of the module. Setting both address switches to 00 configures the module to use E-Series protocol on the RS485 port. When the switches are set within the range 01-99, the module uses Modbus protocol on the RS485 port, with the Modbus address defined by the switches. Whenever these address switches are changed the unit should be reset by disconnecting power.

When using E-Series protocol, the port settings are fixed at 9600 baud, 8 data bits, no parity, 1 stop bit.

The Modbus communications settings are configurable as follows:
Modbus type: RTU, ASCII with 8 data bits, ASCII with 7 data bits. (Note that the configuration software only supports Modbus RTU. A Modbus Master can select ASCII protocol by writing to the appropriate register. See Appendix A).
Baud rate: 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200
Parity: none, odd, even
Stop bits: 1 or 2.

The modules are fitted with a termination switch for the RS485. Set this switch only on the last module in a multi-drop RS485 configuration.

The Honeywell E-Series software is used to configure the XYR 301X modules as part of an E_Series network. The hardware set-up for items such as expected pulse rates and analog signals is also available through this software.

When used as a Modbus-only device, stand-alone configuration software (cfg_Honeywell_Serial_x.xx.exe) is available to set up the modules. All required software may be downloaded from the Honeywell website.

2 Installation

All connections to the module should be SELV only. Normal 110/220/240V mains supply should not be connected to any input terminal of the module.

2.1 General installation

Several XYR 301X modules may be connected to one master via RS485 multi-drop connection as shown in Figure 2-1. Ensure there is good earthing between the XYR 301X units and the master. A 2.5 sqmm / 12 gauge earth wire is recommended.

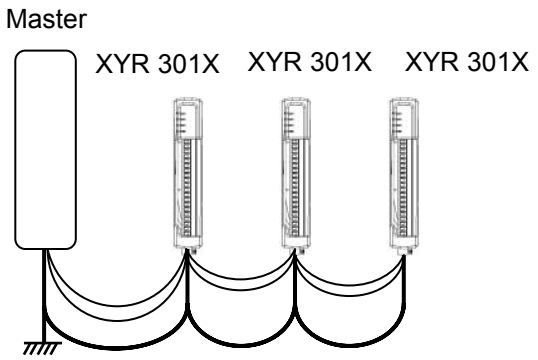

Figure 2-1: Several XYR 301X units connected to a master.

2.1.1 Power Connection

The XYR 301X modules require 12-15VDC power supply. This is supplied to the 4-way connector, shown in Figure 2-2.

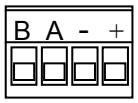

Figure 2-2: Power and RS485 connector. Connect 12-15VDC to '+' and earth to '-'. Connect RS485 to B and A.

2.1.2 Address Switches

The address switches are found on the bottom panel of the module, as shown in. If you are using the XYR 301X module with other Honeywell E-Series modules (Honeywell 300X- modules), the address switches must be set to "00". This enables Honeywell protocol mode.

If you are using a Modbus Master device, ensure each XYR 301X connected to the same Modbus master has a unique Modbus address.

Note that the module must be reset after changing the address switches.

You can connect to a Honeywell XYR 300G-M Gateway Module using either MODBUS protocol or Honeywell protocol. Honeywell protocol is easier to set up, and we recommend using this protocol for most applications.

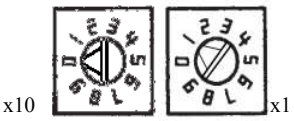

Figure 2-3: Address switches. The address shown is 01.

Connect the RS485 B and A wires to the 4-way connector shown previously in Figure 2-2. An RS485 termination switch is provided. Terminate the last XYR 301X module in the multi-drop setup as shown in Figure 2-4.

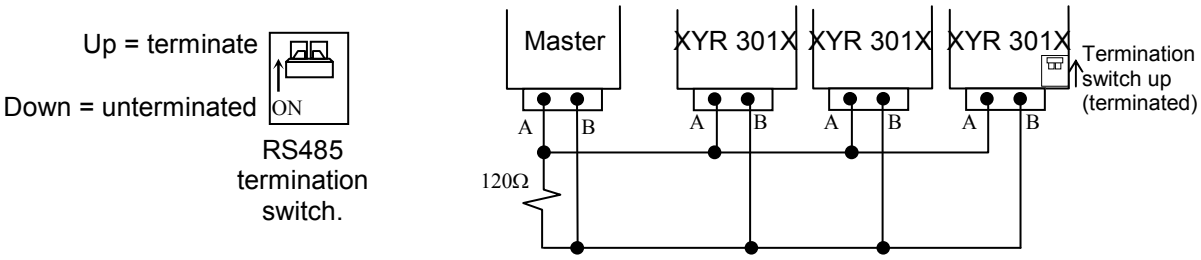

Figure 2-4: RS485 multi-drop connection and termination (only use external termination for the master if it does not have internal termination).

2.2 Signal Connections

All connections to the module should be SELV only. Normal 110/220/240V mains supply should not be connected to any input terminal of the module.

2.2.1 Digital Inputs (and Pulsed Inputs)

The XYR 3011 I/O supports 16 digital signals, and the XYR 3012 I/O and XYR 3013 I/O support 8 digital signals. Additionally, digital inputs DIO1-4 on the XYR 3011 I/O operate as pulse inputs.

Digital output signals share the same terminals as the Digital input signals, marked DIO1-8, and DIO1-16 on the XYR 3011 I/O module.

A digital input is activated by connecting to EARTH, either by voltage-free contact or by a transistor switch. Refer to Figure 2-5:

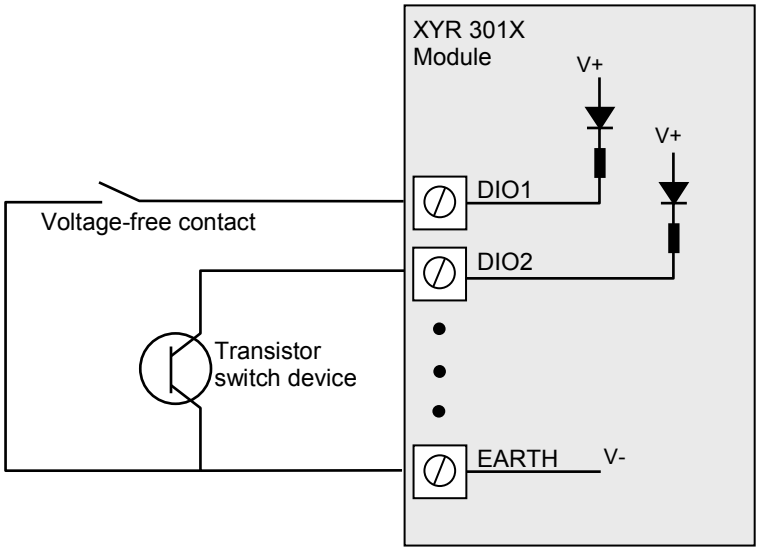

Figure 2-5: Connection of digital inputs.

2.2.2 Digital Outputs (and Pulsed Outputs)

The XYR 3011 I/O supports up to 16 digital outputs, shared with the digital input function on the same terminals. The XYR 3012 I/O and XYR 3013 I/O both provide 8 digital output signals. These signals are marked DIO1-8, and DIO1-16 for the XYR 3011 I/O. On all XYR301X modules, DIO1-8 can also operate as pulsed outputs.

When active, digital outputs provide a transistor switch to EARTH. To connect a digital output, refer to the diagram in Figure 2-6. A bypass diode is recommended to protect against switching surges for inductive loads such as relay coils.

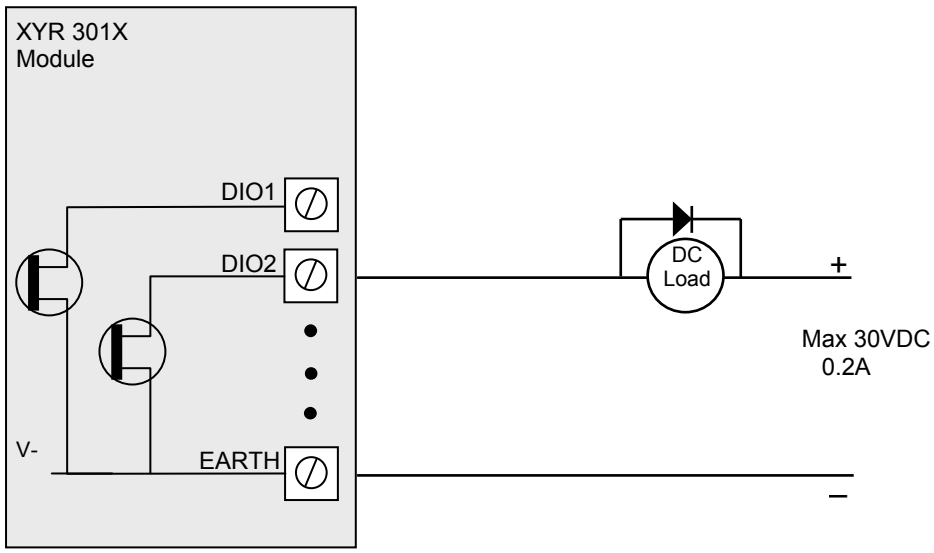

Figure 2-6: Connection of digital outputs.

Note that digital outputs will only switch DC circuits, with maximum voltage 30VDC.

2.2.3 Analog Inputs

The XYR 3012 I/O provides eight grounded single-ended or four floating differential analog inputs. These provide measurement of voltage signals (0-10V) or current (0-20 mA) signals. An internal 24V analog loop supply (ALS) is generated for current loops.

Refer to Section 4.4 for detail on configuring single-ended, differential, current-mode or voltage mode inputs.

2.2.3.1 Grounded Single-Ended mA Inputs

Single-ended current inputs allow twice as many inputs as the differential mode. This mode is useful when the sensor loop can be grounded to the XYR 301X module. Devices may also be powered by the 24V supplied by the XYR301X. Refer to Figure 2-7:

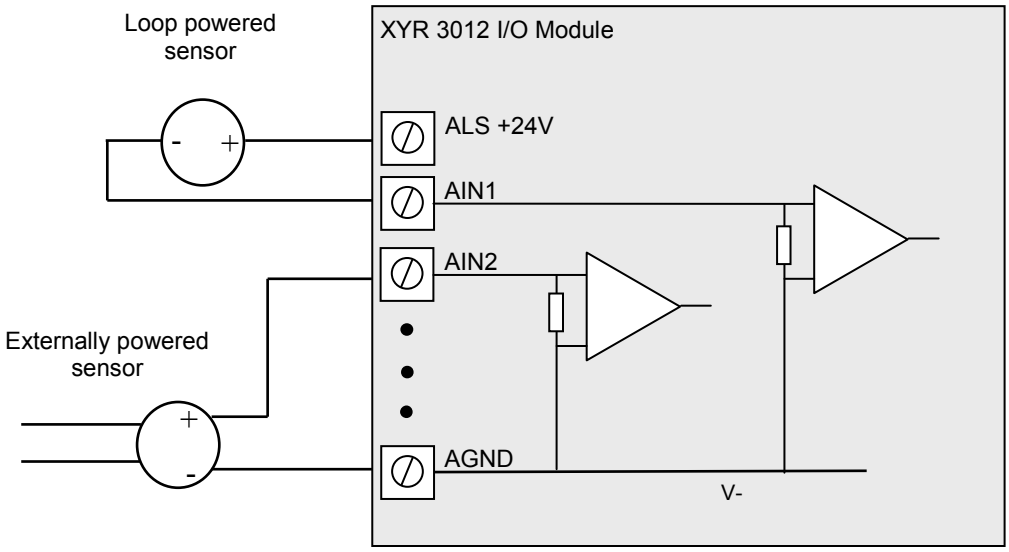

Figure 2-7: Connection for single-ended current inputs. Transducers may be externally powered or powered by the XYR 301X +24V loop supply.

Note:

- The module is configured at the factory for this type of input
- To change the input configuration, refer to section 4.4

2.2.3.2 Floating Differential Mode mA Inputs

Differential mode current inputs should be used when measuring a current loop which cannot be connected to earth or ground. This allows the input to be connected anywhere in the current loop. Common mode voltage can be up to 27VDC.

Up to four loops can be connected to terminal pairs [AIN1-AIN2], [AIN3-AIN4], [AIN5-AIN6], [AIN7-AIN8] - the former terminal is +ve and the latter –ve.
The diagram in Figure 2-8 indicates how to connect devices for differential mode current inputs.

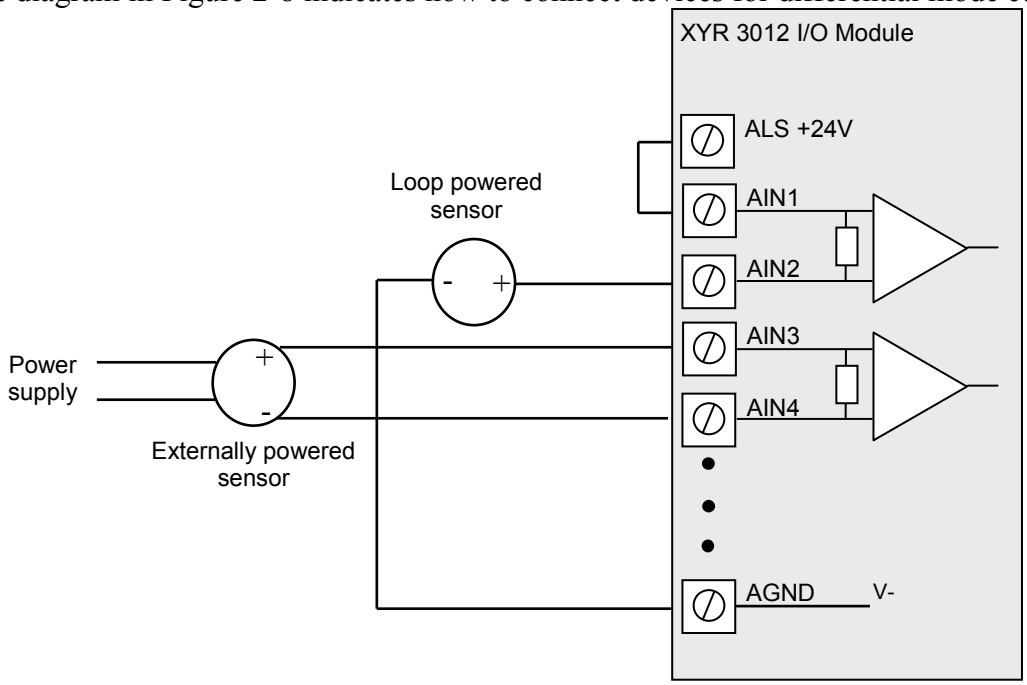

Figure 2-8: Connections for differential current inputs.

Note:

- The module configuration needs to be changed for this type of input
- To change the input configuration, refer to section 4.4

2.2.3.3 Floating Differential Voltage Inputs

Differential voltage inputs allow a voltage to be measured when it cannot be referenced to earth or ground. The diagram in Figure 2-9 shows how to connect differential voltage inputs. The module has a 27V common mode input range.

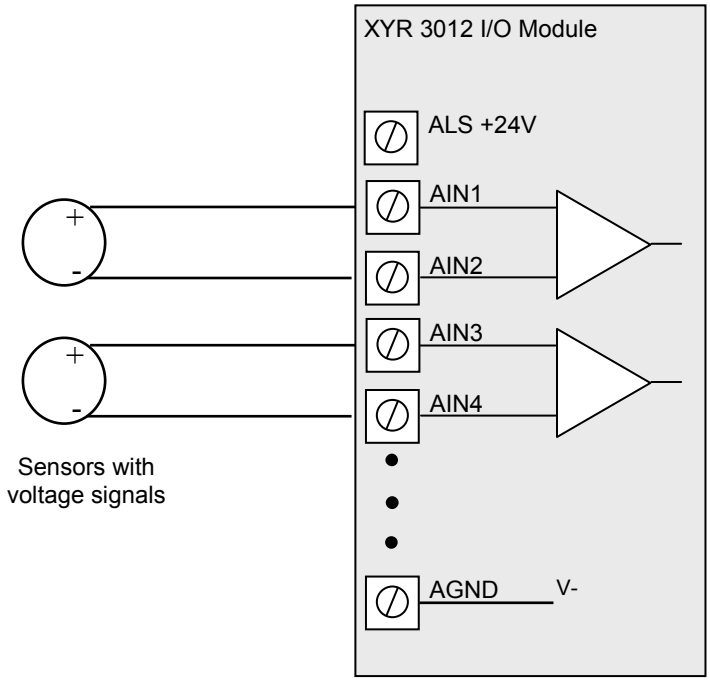

Figure 2-9: Connection for differential voltage input mode.

Note:

- The module configuration needs to be changed for this type of input
- To change the input configuration, refer to section 4.4

2.2.3.4 Single-ended Voltage Input

Single-ended voltage inputs allow twice as many inputs as differential mode. This mode is useful when one end of the input voltage can be connected to the ground of the XYR 301X module. Figure 2-10 shows connections for single-ended voltage input.

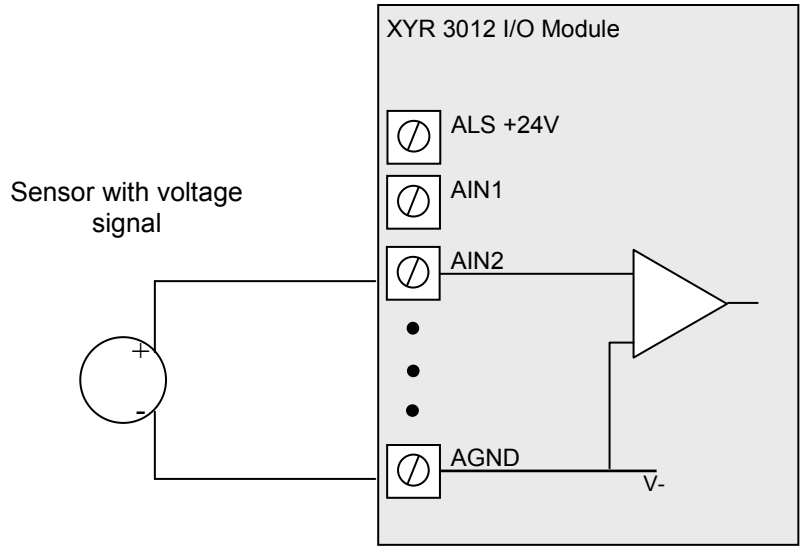

Figure 2-10: Connection for single-ended voltage input.

Note:

- The module configuration needs to be changed for this type of input
- To change the input configuration, refer to section 4.4

2.2.4 Analog Outputs

The XYR 3013 I/O provides eight analog outputs. These may be configured as voltage or current outputs. The current output may be selected as “sink” or “source” current.

Refer to Section 4.5 for detail on configuring analog outputs.

2.2.4.1 Current Output

Current output mode may be configured for current source or current sink. Figure 2-11 shows the connections for current source mode. Figure 2-12 shows the connections for current sink.

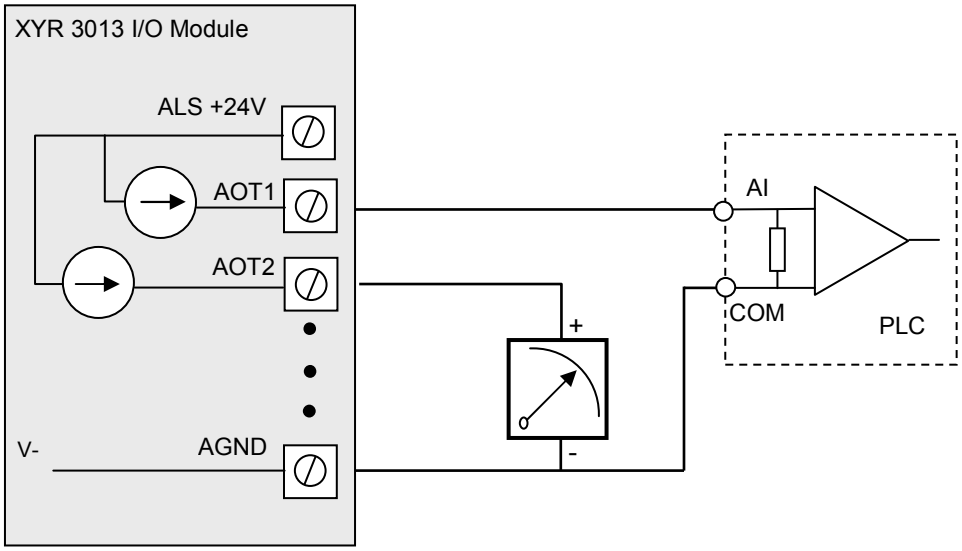

Figure 2-11: Connection for current source output.

Note:

- The module is configured at the factory for this type of output connection
- To change the input configuration, refer to section 4.5.

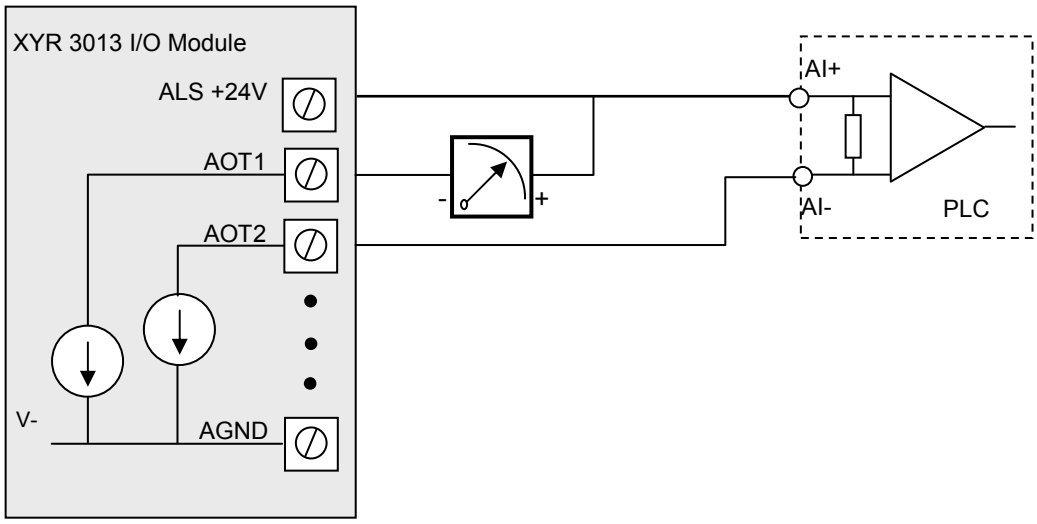

Figure 2-12: Connection for current sink output.

Note:

- The hardware configuration needs to be changed for this type of output connection
- To change the hardware configuration, refer to section 4.5.

2.2.4.2 Voltage Output

Voltage output mode produces a voltage referenced to the module's AGND. Figure 2-13 shows the connection for voltage output configuration.

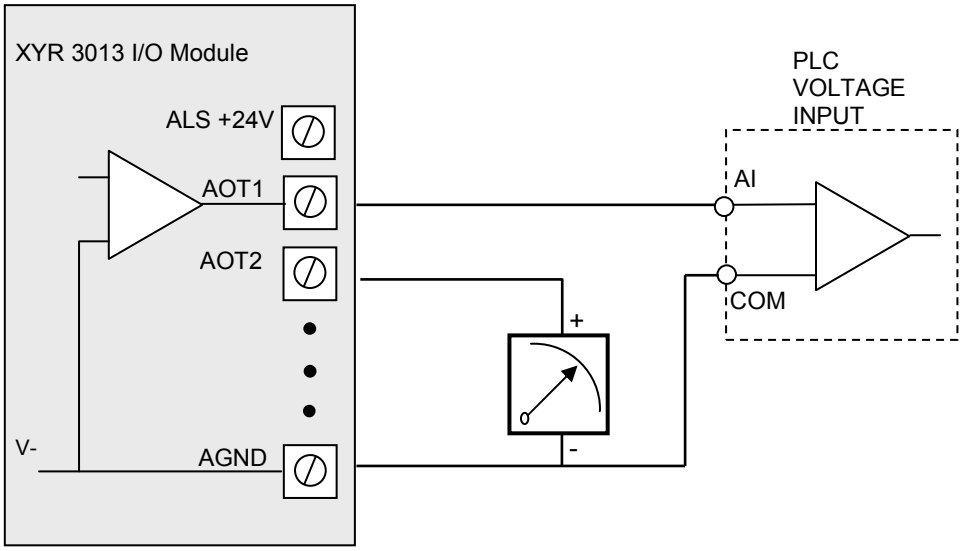

Figure 2-13: Connection for voltage output configuration.

3 Configuration

Use the Honeywell Configuration utility to configure the XYR 301X module to communicate to Honeywell and XYR 300X modules.

- If you want to communicate using MODBUS, then simply set the address using the address switches on the bottom of the module. Refer to section 2.1.2 for details on setting the address switches
- Ensure the Address switches are set to “00” for Honeywell protocol mode. Refer to section 2.1.2 for details on setting the address switches.

The Honeywell Configuration utility allows you to configure systems consisting of a mixture of Honeywell Module types. You can get this software from the Honeywell web-site, or from the Honeywell Product CD included with your device.

3.1 Add a radio module to connect the XYR 301X to the radio network.

To configure a Serial module you must first create configuration for a radio module – For example a XYR 3001 I/O module. This is the radio module you plan to connect the serial module to.

- Refer to your radio module user manual for an explanation on how to create the radio module configuration.

3.2 Add the Serial Module

Once you have created the new radio module configuration, you can add the serial module. Select the new radio module that you want to connect the XYR 301X serial module to, and select the “Serial Units” item. Select “Add a new Serial Unit” to create the new configuration , or select “Load a New Serial Unit” to load the configuration from an existing module. See Figure 3-1.

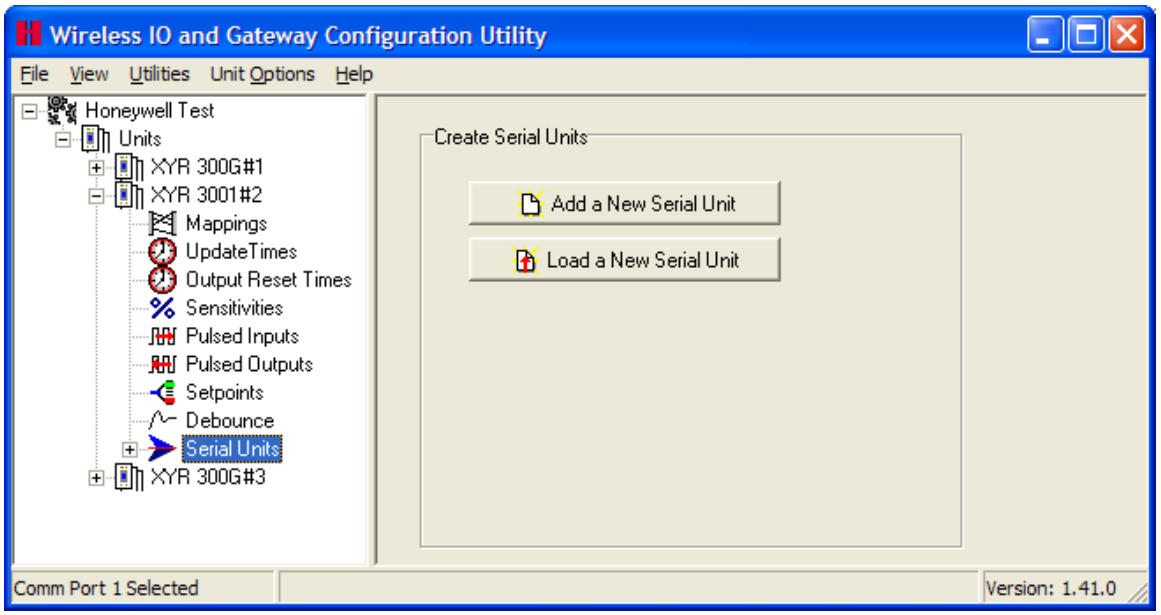

Figure 3-1: Configuration of XYR 301X modules using Honeywell Configuration Utility.

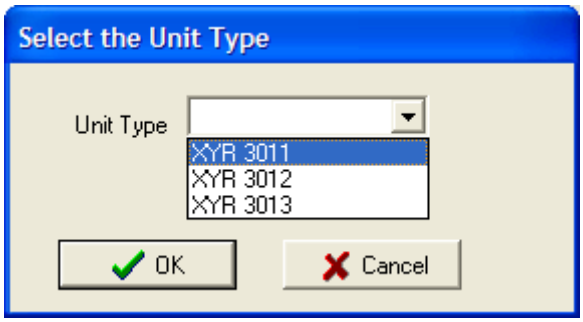

Figure 3-2: Select the unit type.

When you select “Add a new Serial Unit” you will need to select the unit type. Select the correct module type here.

Finally, you will be prompted to select the module address. You can choose to allow the configuration software to select an unused address for you, or you can select the module address manually.

- Serial Module address must be in the range 96 to 127.
- Every serial module that is connected to the same radio module needs a separate address.
- You can use the same address on two different serial modules if they are connected to different radio modules.

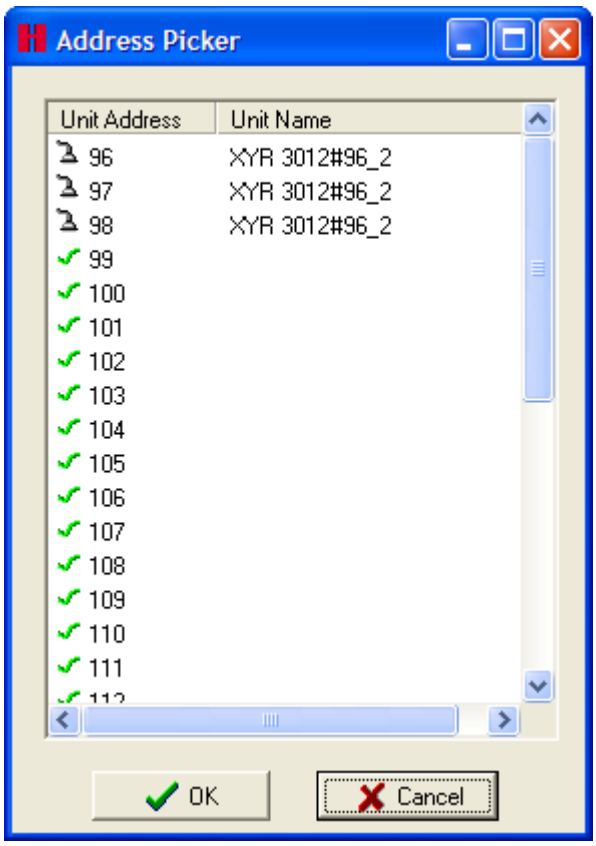

Figure 3-3: Select unit address.

For more information on configuring Honeywell E-Series modules using the E-Config software, refer to the XYR3001 user manual.

4 Hardware Configuration

Hardware Set-up allows the XYR 301X hardware function to be adjusted to suit the application. To configure the hardware settings, you need:

- Access to the DIP switches under the Analog Configuration Panel (refer Figure 1-1: XYR 301X unit with significant parts labeled.)
- Configuration Software to run on your PC.

Configuration of the XYR 301X modules is performed by either the dedicated XYR 301X configuration software (cfg_Honeywell_Serial_x.xx.exe), or by the Honeywell E-Series configuration software (from the Utilities / Advanced - SXM menu). The software is available from Honeywell's Product CD or web page

4.1 Connecting to the XYR 301X module

To use the configuration software, perform the following steps:

- Connect the XYR 301X to the PC COM port with a standard serial cable (straight-through, DB9 female to DB9 male. See Appendix for wiring.)
- Set the address switches to 00
- Supply power to the XYR 301X via the "+" and "-" terminals on the bottom of the module (12-15VDC).
- Start the configuration software on your PC or laptop (cfg_Honeywell_Serial_x.xx.exe)

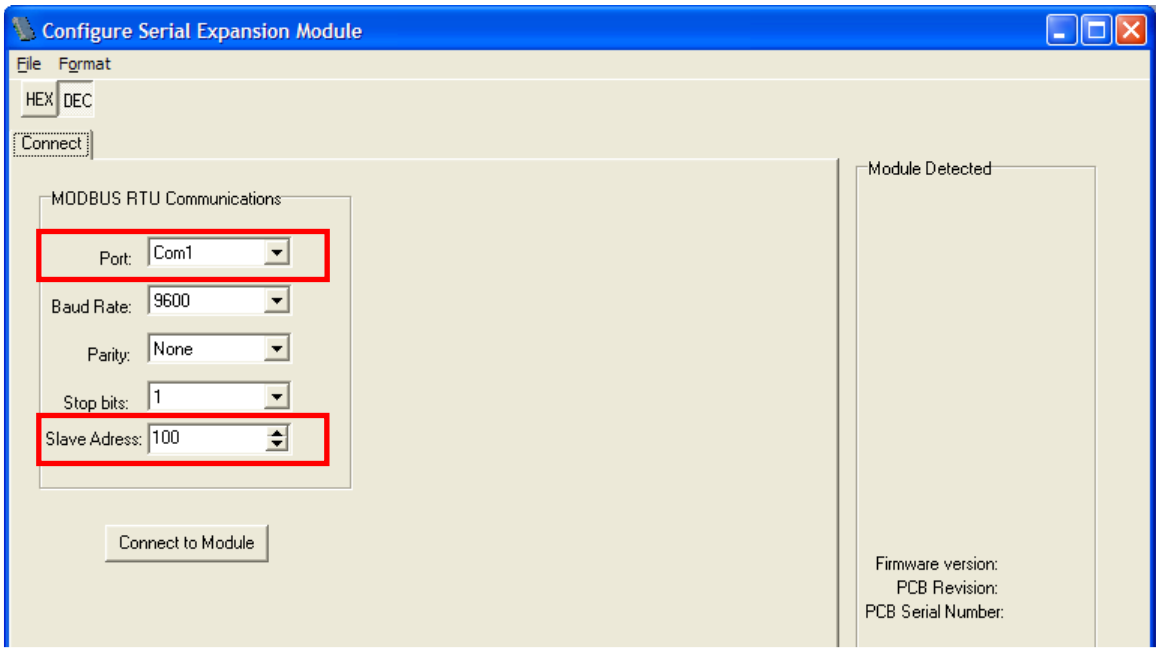

Figure 4-1: Main configuration screen.

- Set the “Port” setting to match the computer com port you have connected to.
- Set the “Slave Address” to match the address switch setting of the XYR 301X. If you are using address “00” for Honeywell Protocol, set the Slave Address to 100.
- Set the communications parameters. The default communications parameters are:

  Baud rate: 9600
  Parity: NONE
  Stop bits: 1

Click the button labeled *Connect to XYR 301X*.

If you are unable to communicate with the XYR 301X, refer to Appendix C: Comms Recovery.

If connection has been successful, several folder tabs will become available, depending on the module type. The panel on the right-hand side of the form shows the XYR 301X detected and its settings.

4.2 Configuration common to all modules

4.2.1 Communications

Select the *Comms* folder tab. This page allows you to change the communications settings of the XYR 301X.

These settings are applied to both the RS-232 configuration port and to the RS-485 Modbus interface port.

Choose the required settings, then click *Set comms*. You will need to power off / on the XYR 301X for the new settings to take effect.

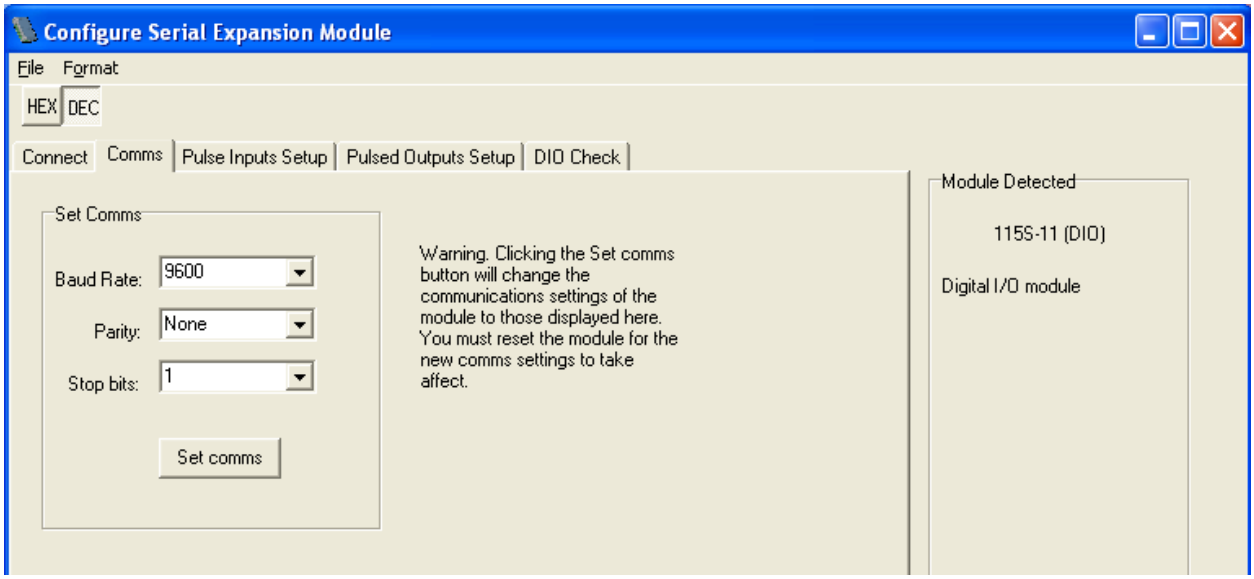
Configure Serial Expansion Module
File Format
HEX DEC
Connect Comms Pulse Inputs Setup Pulsed Outputs Setup DIO Check
Set Comms
Baud Rate: 9600
Parity: None
Stop bits: 1
Set comms
Warning. Clicking the Set comms button will change the communications settings of the module to those displayed here. You must reset the module for the new comms settings to take affect.
Module Detected
115S-11 (DIO)
Digital I/O module

Figure 4-2: Communications configuration screen.

Note that you will need to change the connection settings on the “Connect” page, and re-connect to the XYR 301X.

4.2.2 Pulsed outputs

Choose the folder tab labelled *Pulsed Outputs Setup*, as shown in Figure 4-3.

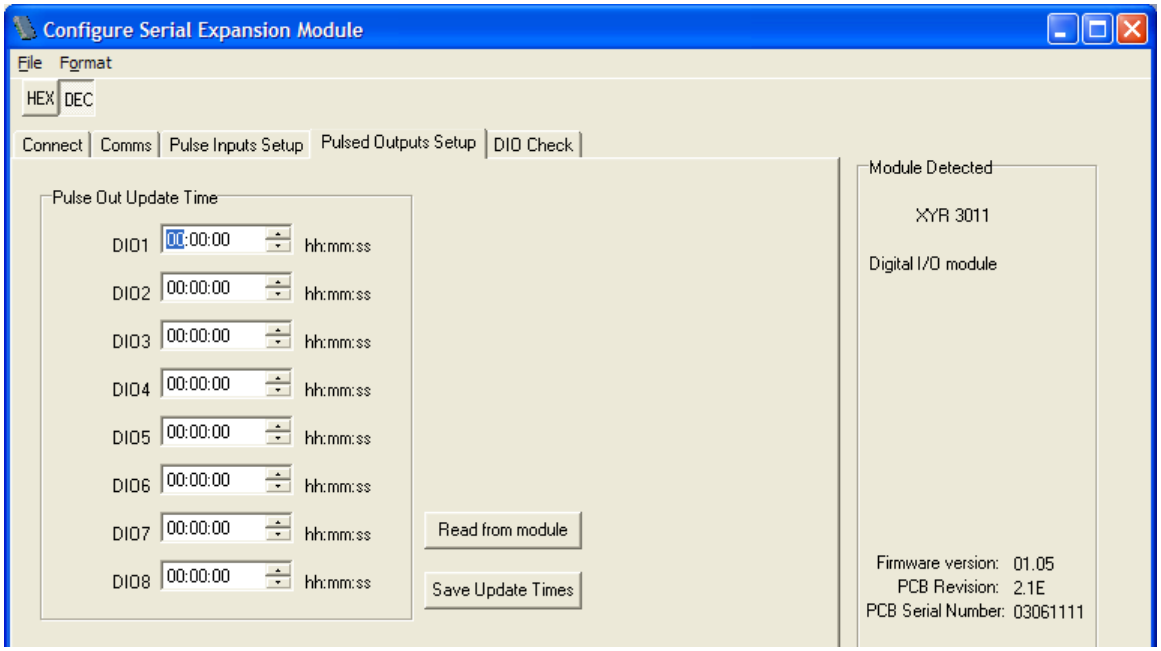

Figure 4-3: Pulsed outputs setup page for a XYR 3011 I/O. The pulsed outputs are available on all models.

Clicking the button *Read from XYR 301X* will read the pulse out update times from the XYR 301X and display them on the form.

The Pulse Out Update Times should be set to the approximate interval at which the XYR 301X will receive updates to its pulse out target register. The pulse output circuitry will attempt to generate pulses at a rate that will reach the target pulse count within the update time. For example, if the Modbus master unit is configured to send the register value for the pulse output channel every 1 minute, then the Update Time should be set to 1 minute.

The maximum allowed pulse out update time is 34 minutes 57 seconds. Set the update times for each channel in hours, minutes, and seconds. An update time of zero will never produce any pulses.

After the update times have been set, click the *Save Update Times* button.

The pulse output feature can be tested on the *Check* folder tab (refer section 5).

4.3 XYR 3011 I/O configuration

4.3.1 Pulsed Inputs

Choose the *Pulse Inputs Setup* page, as shown in Figure 4-4.

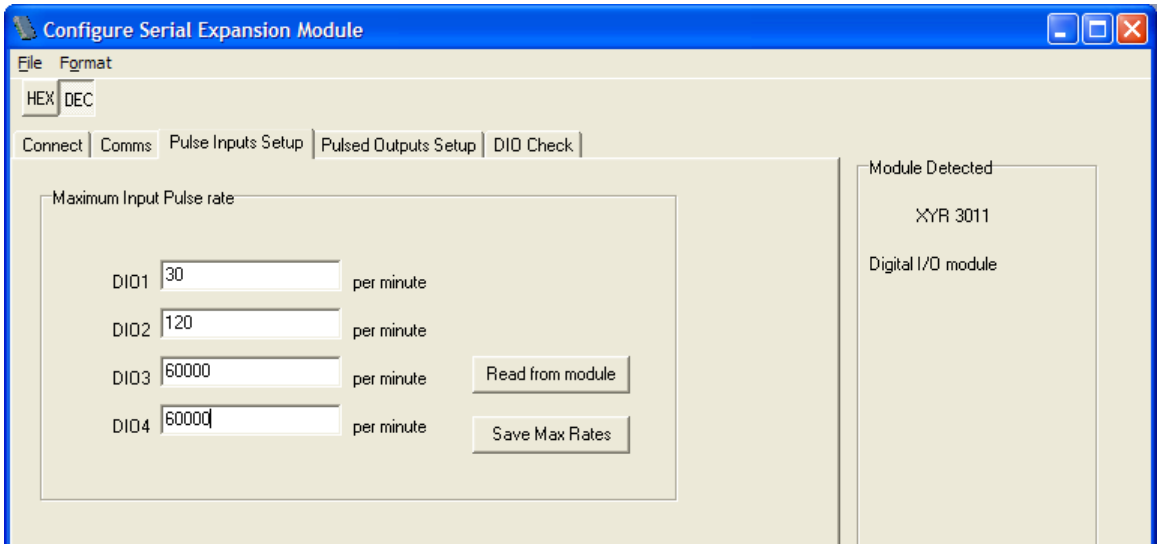

Figure 4-4: Pulse inputs setup. Only available on a XYR 3011 I/O module.

Clicking the *Read from XYR 301X* button reads the existing maximum pulse rate settings from the XYR 301X and displays them on the form.

If pulse rate is to be used, the maximum pulse input rate must be set. The pulse rate value is calculated as a fraction of the maximum pulse input rate. Specify the maximum pulse input rate in pulses per minute. The highest allowable pulse input rate is 60000 pulses per minute, or 1kHz.

Once the maximum pulse rates are specified, click the *Save Max Rates* button to save the data to the XYR 301X module.

The pulse input feature can be tested on the *DIO Check* page (refer section 5.1).

4.4 XYR 3012 I/O configuration

4.4.1 Voltage input

Voltage inputs may be selected in the scales 0 to 5V, 0 to 10V, or 1 to 5V. For each scale, the minimum to maximum signal levels are represented by 4000 hex to C000 hex.

4.4.1.1 Single-ended voltage input

If the XYR 3012 I/O is to measure voltage with respect to ground, choose the Single-ended voltage input page, as shown in Figure 4-5.

> Remove the access panel from the front of the XYR 3012 I/O case to gain access to the dip switches. Replace the access panel after setting the switches.

Set the switches according to the picture shown. The unit should be orientated with the 20-way connector towards you.

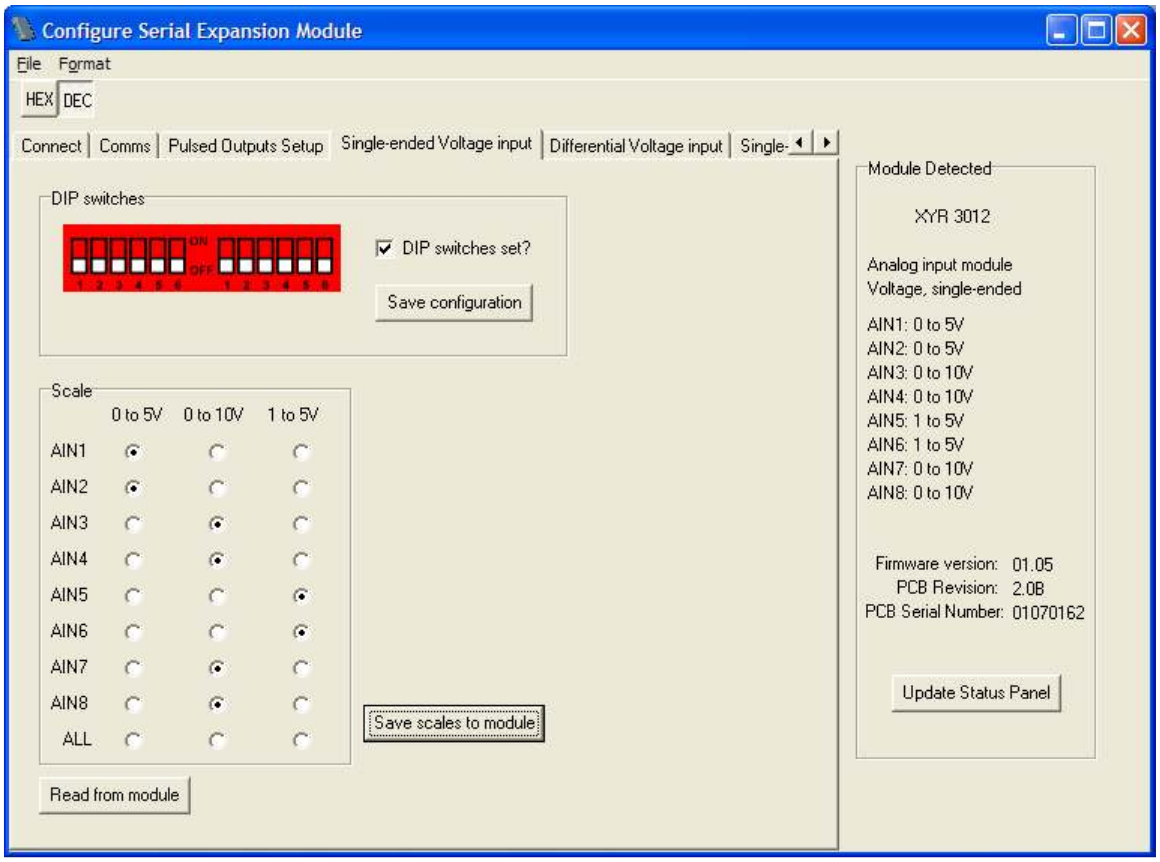

Figure 4-5: Setup page for single-ended voltage input.

Once the dip switches on the unit are set, tick the checkbox on the form, and click *Save configuration*. Check the *XYR 301X Detected* panel to ensure that the analog mode has been updated (to Voltage, single-ended).

Clicking *Read from XYR 301X* will read the scales out of the unit (if any) and display them in the scales grid. Note that the dip switches should be set correctly for this result to be relevant.

Choose the desired scale for each channel in the *Scale* box. Click the *Save scales to XYR 301X* button, and check that the scales are updated in the *XYR 301X Detected* panel.

4.4.1.2 Differential voltage input

The XYR 3012 I/O can be configured to measure differential voltage. Neighboring channels serve as reference voltages in this mode. The four differential pairs are: AIN1-AIN2, AIN3-AIN4, AIN5-AIN6, and AIN7-AIN8.

Choose the page to configure the XYR 3012 I/O for differential voltage input, as shown in Figure 4-6.

> Remove the access panel from the front of the XYR 3012 I/O case to gain access to the dip switches. Replace the access panel after setting the switches.

Set the switches according to the picture shown. The unit should be orientated with the 20-way connector towards you.

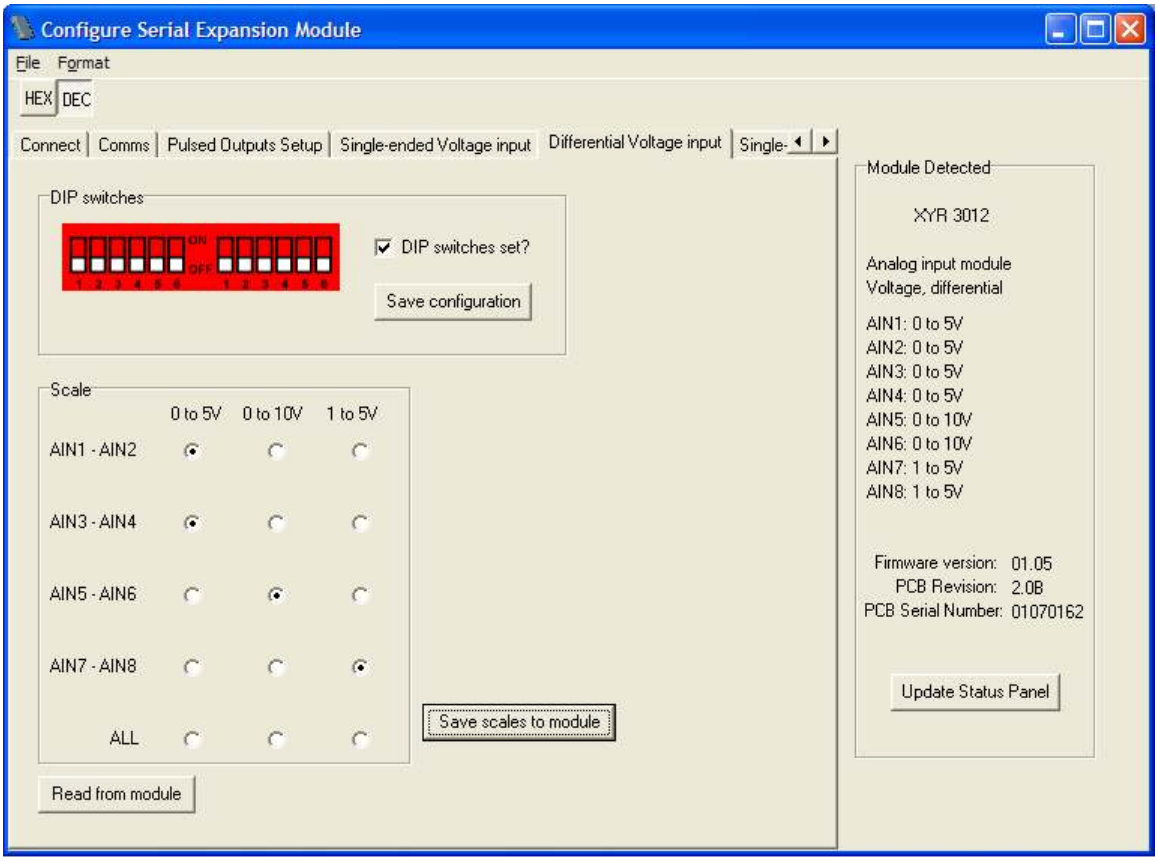

Figure 4-6: Setup page for differential voltage input.

Once the dip switches on the unit are set, tick the checkbox on the form, and click *Save configuration.* Check the *XYR 301X Detected* panel to ensure that the analog mode has been updated (to Voltage, differential).

Clicking *Read from XYR 301X* will read the scales out of the unit (if any) and display them in the scales grid. Note that the dip switches should be set correctly for this result to be relevant.

Choose the desired scale for each channel in the *Scale* box. Click the *Save scales to XYR 301X* button, and check that the scales are updated in the *XYR 301X Detected* panel.

4.4.2 Current input

4.4.2.1 Current inputs may be selected in the scales 0 to 10mA, 0 to 20mA, or 4 to 20mA. For each scale, the minimum to maximum signal levels are represented by 4000 hex to C000 hex.

Single-ended current input

The XYR 3012 I/O can also measure current input. To measure current with respect to ground, choose the Single-ended current input page, as shown in Figure 4-7.

> Remove the access panel from the front of the XYR 3012 I/O case to gain access to the dip switches. Replace the access panel after setting the switches.

Set the switches according to the picture shown. The unit should be orientated with the 20-way connector towards you.

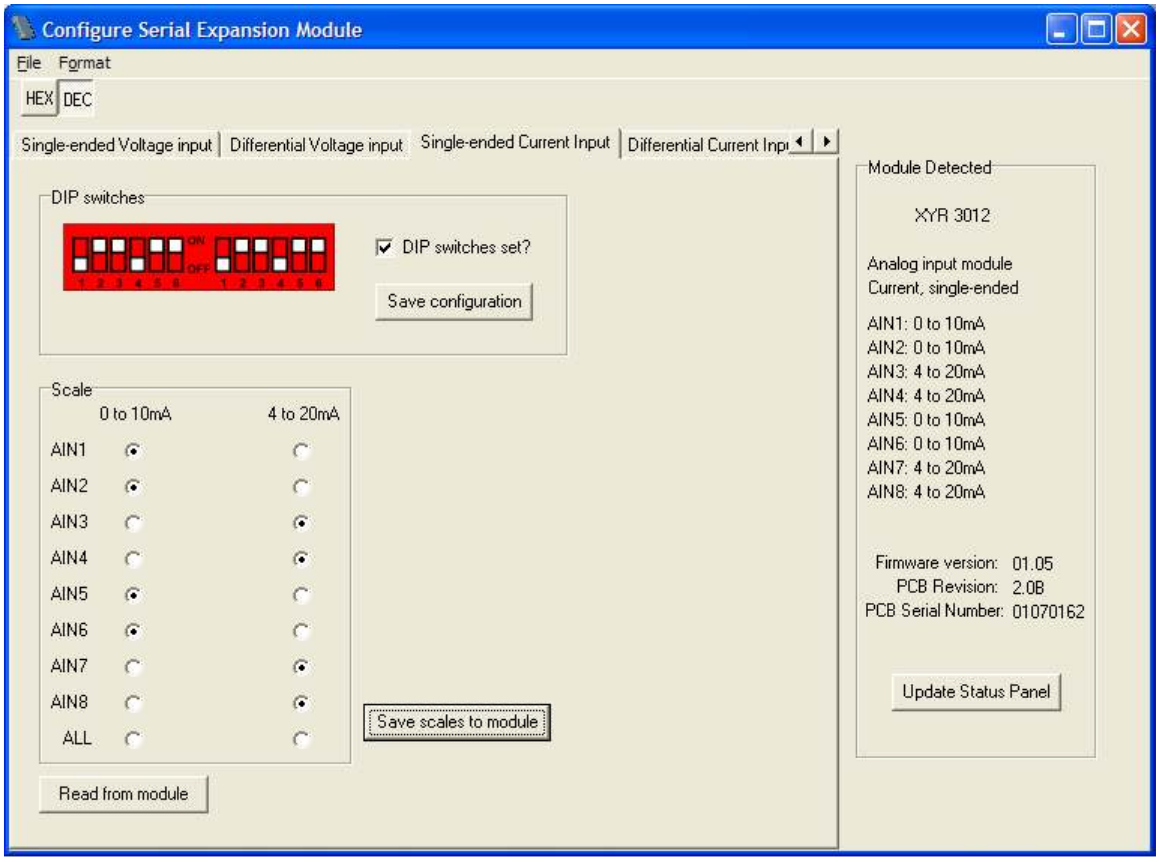

Figure 4-7: Setup page for single-ended current input.

Once the dip switches on the unit are set, tick the checkbox on the form, and click *Save configuration.* Check the *XYR 301X Detected* panel to ensure that the analog mode has been updated (to Current, single-ended).

Clicking *Read from XYR 301X* will read the scales out of the unit (if any) and display them in the scales grid. Note that the dip switches should be set correctly for this result to be relevant.

Choose the desired scale for each channel in the *Scale* box. Click the *Save scales to XYR 301X* button, and check that the scales are updated in the *XYR 301X Detected* panel.

4.4.2.2 Differential current input

The XYR 3012 I/O can be configured to measure differential current. The differential pairs are: AIN1-AIN2, AIN3-AIN4, AIN5-AIN6, AIN7-AIN8. To use this configuration, choose the differential current input page, as shown in Figure 4-8.

> Remove the access panel from the front of the XYR 3012 I/O case to gain access to the dip switches. Replace the access panel after setting the switches.

Set the switches according to the picture shown. The unit should be orientated with the 20-way connector towards you.

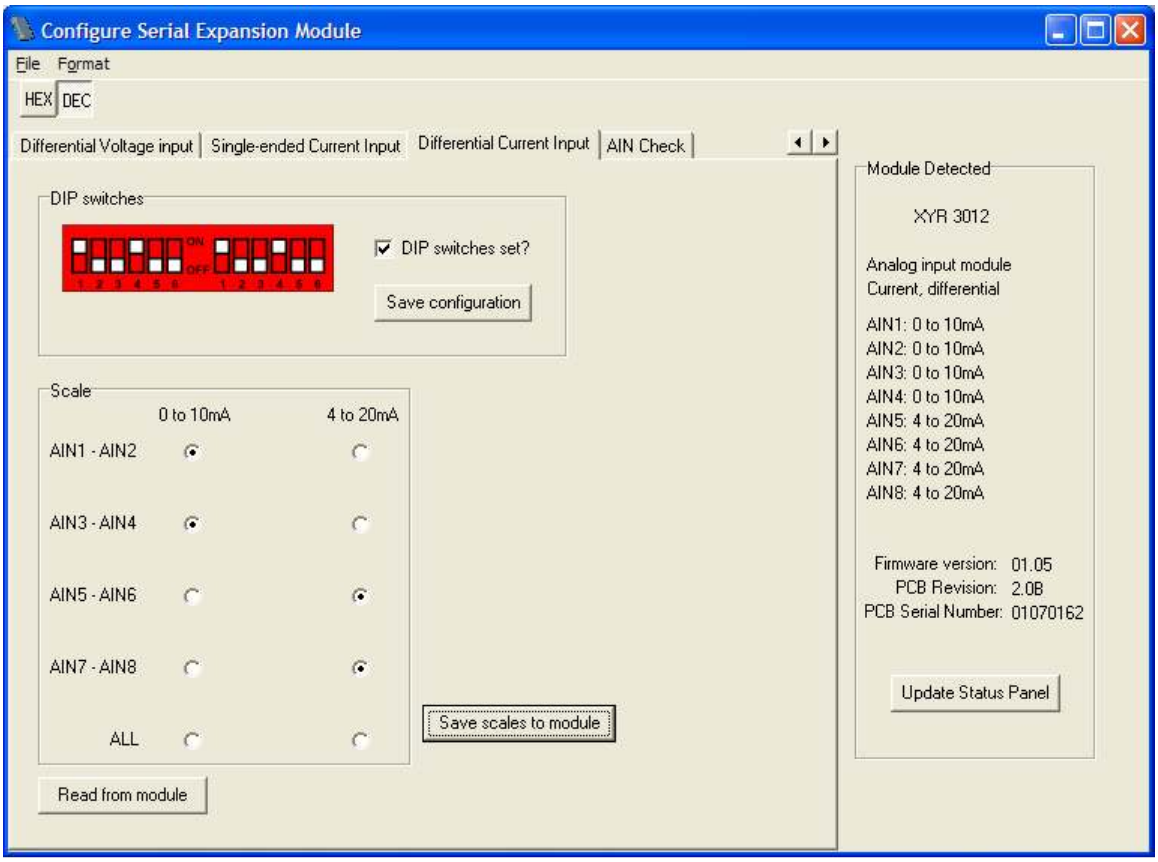

Figure 4-8: Setup page for differential current configuration.

Once the dip switches on the unit are set, tick the checkbox on the form, and click *Save configuration.* Check the *XYR 301X Detected* panel to ensure that the analog mode has been updated (to Current, differential).

Clicking *Read from XYR 301X* will read the scales out of the unit (if any) and display them in the scales grid. Note that the dip switches should be set correctly for this result to be relevant.

Choose the desired scale for each channel in the *Scale* box. Click the *Save scales to XYR 301X* button, and check that the scales are updated in the *XYR 301X Detected* panel.

4.5 XYR 3013 I/O configuration

4.5.1 Voltage output

Voltage outputs may be selected in the scales 0 to 5V, 0 to 10V, or 1 to 5V. For each scale, the minimum to maximum signal levels are represented by 4000 hex to C000 hex. To configure the XYR 3013 I/O for voltage output, select the page as shown in
Figure 4-9.

> Remove the access panel from the front of the XYR 3012 I/O case to gain access to the dip switches. Replace the access panel after setting the switches.

Set the switches according to the picture shown. The unit should be orientated with the 20-way connector towards you.

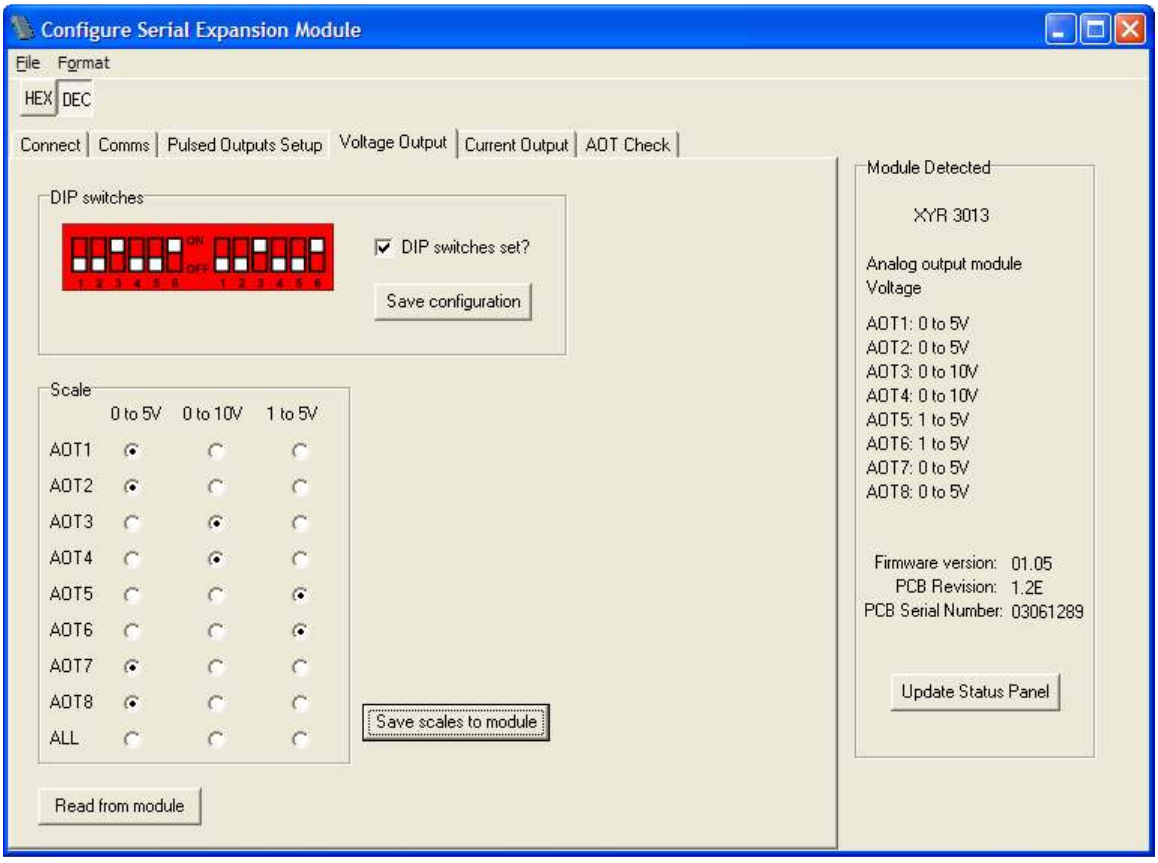

Figure 4-9: Voltage output setup page.

Once the dip switches on the unit are set, tick the checkbox on the form, and click *Save configuration.* Check the *XYR 301X Detected* panel to ensure that the analog mode has been updated (to Voltage).

Clicking *Read from XYR 301X* will read the scales out of the unit (if any) and display them in the scales grid. Note that the dip switches should be set correctly for this result to be relevant.

Choose the desired scale for each channel in the *Scale* box. Click the *Save scales to XYR 301X* button, and check that the scales are updated in the *XYR 301X Detected* panel.

4.5.2 Current output

Current outputs may be selected in the scales 0 to 10mA, 0 to 20mA, or 4 to 20mA. For each scale, the minimum to maximum signal levels are represented by 4000 hex to C000 hex.

To configure the XYR 3013 I/O for current output, select the page as shown in Figure 4-10.

> Remove the access panel from the front of the XYR 3012 I/O case to gain access to the dip switches. Replace the access panel after setting the switches.

Set the switches according to the picture shown. The unit should be orientated with the 20-way connector towards you.

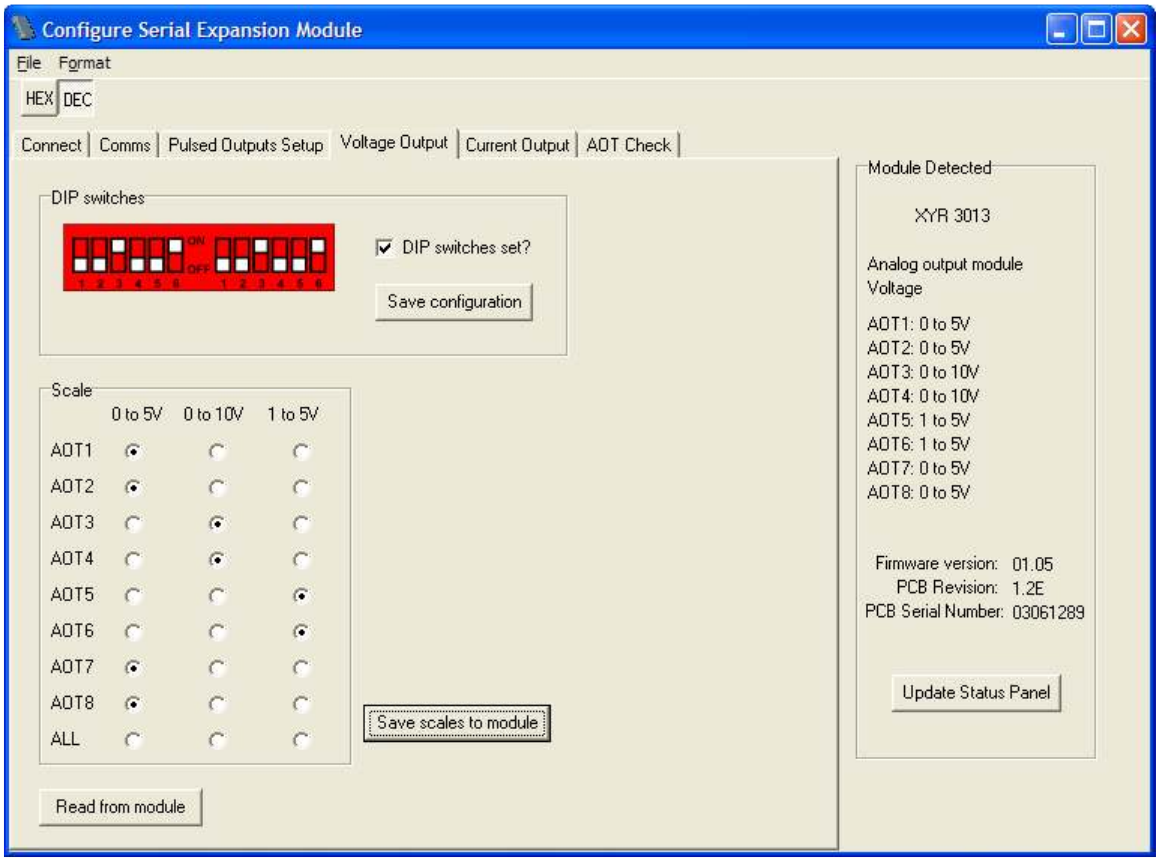

Figure 4-10: Current output setup page.

Once the dip switches on the unit are set, tick the checkbox on the form, and click *Save configuration.* Check the *XYR 301X Detected* panel to ensure that the analog mode has been updated (to Current).

Clicking *Read from XYR 301X* will read the scales out of the unit (if any) and display them in the scales grid. Note that the dip switches should be set correctly for this result to be relevant.

Choose the desired scale for each channel in the *Scale* box. Click the *Save scales to XYR 301X* button, and check that the scales are updated in the *XYR 301X Detected* panel.

5 Operation

5.1 XYR 3011 I/O module

The I/O terminal block for the XYR 3011 I/O is shown in Figure 5-1.

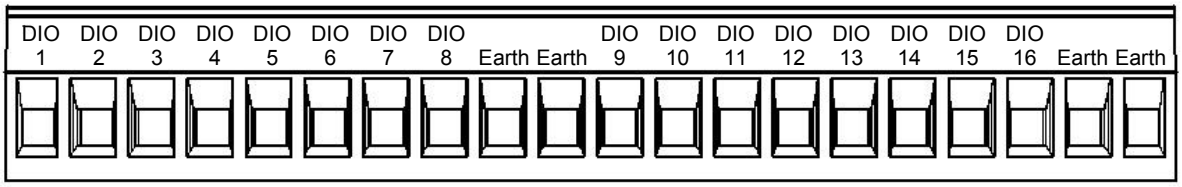

Figure 5-1: I/O terminal block for XYR 3011 I/O.

Pulse inputs coincide with DIO terminals 1-4. Pulse outputs coincide with DIO terminals 1-8.

The operation of the digital I/O may be confirmed using the configuration software. Start the software as described in section 4, and choose the *DIO Check* page as shown in Figure 5-2.

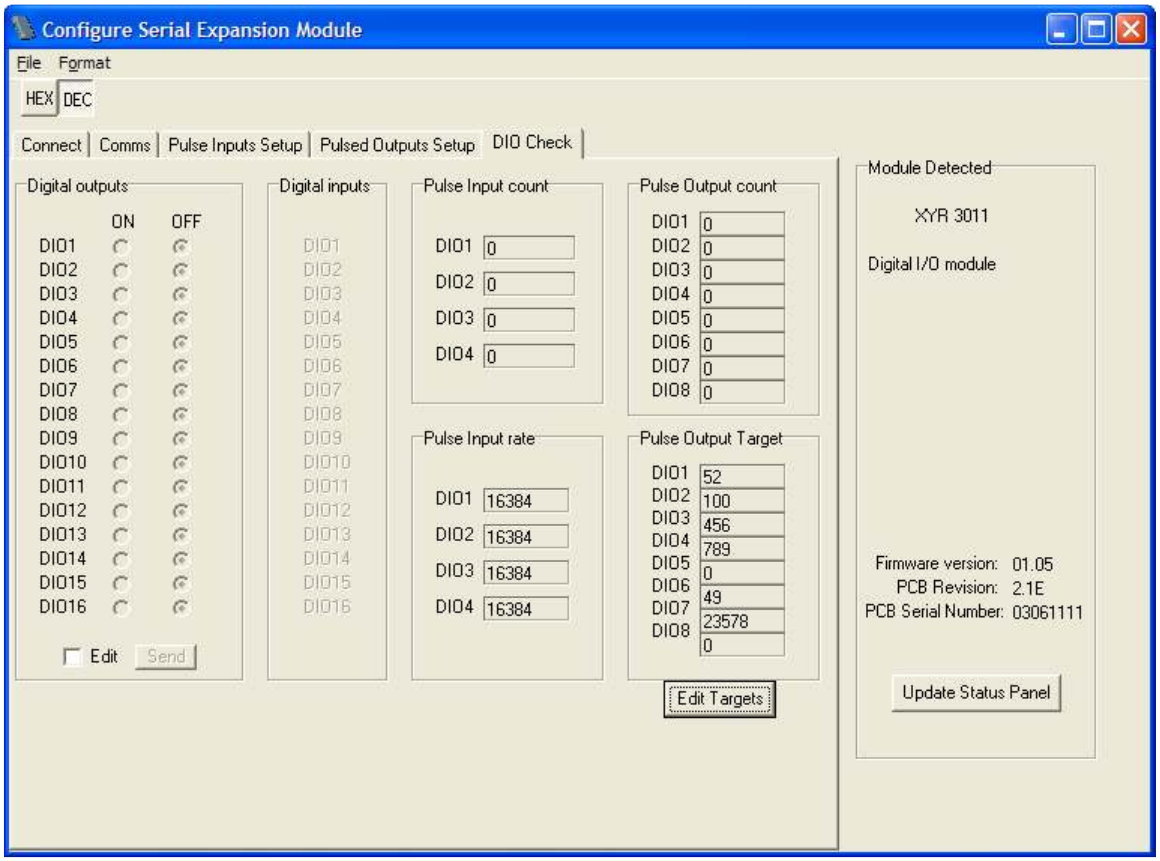

Figure 5-2: Check the operation of the XYR 3011 I/O module using the DIO Check page.

Test the digital outputs by setting the select-buttons to ON or OFF - this will force the DO to the selected state.

Digital inputs are reflected in the software by blacking (ON) or greying (OFF) of the associated label in the Digital Inputs column.

The pulsed input count values are shown, as well as the pulse rate. The rate can be viewed in decimal or hexadecimal and represents a fraction of the maximum pulse rate, where hex 4000 is 0% and hex C000 is 100% of the maximum pulse rate.

The pulse output count values are also shown. The pulse out target may be set by clicking the *Edit Targets* button. Pulses will be produced until the count reaches the target.

5.2 XYR 3012 I/O module

The I/O terminal block for the XYR 3012 I/O is shown in Figure 5-3.

Figure 5-3: I/O terminal block for XYR 3012 I/O.

Pulse outputs coincide with DIO terminals 1-8.

The operation of the XYR 3012 I/O may be confirmed using the configuration software. Start the software as described in section 4, and choose the *AIN Check* page as shown in Figure 5-4.

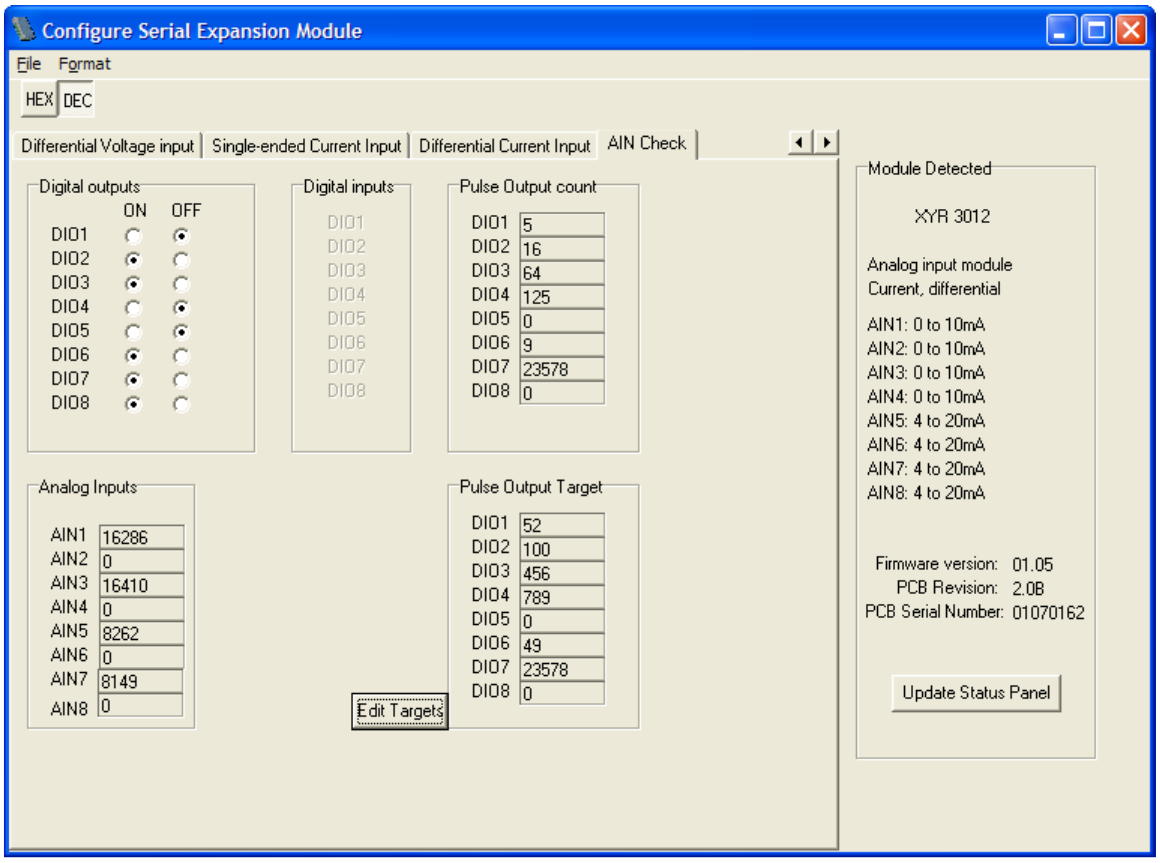

Figure 5-4: Check the operation of the XYR 3012 I/O module with the AIN Check page.

Test the digital outputs by setting the select-buttons to ON or OFF - this will force the DO to the selected state.

Digital inputs are reflected in the software by blacking (ON) or greying (OFF) of the associated label in the Digital Inputs column.

The pulse output count values are also shown. The pulse out target may be set by clicking the *Edit Targets* button. Pulses will be produced until the count reaches the target.

The analog inputs can be viewed in decimal or hexadecimal and represents a fraction of the analog signal, where hex 4000 is 0% and hex C000 is 100%.

In differential configuration, only the value of the first channel in the differential pair shows the quantity being measured. The second channel of each differential pair should be ignored.

5.3 XYR 3013 I/O module

The I/O terminal block for the XYR 3013 I/O is shown in Figure 5-5.

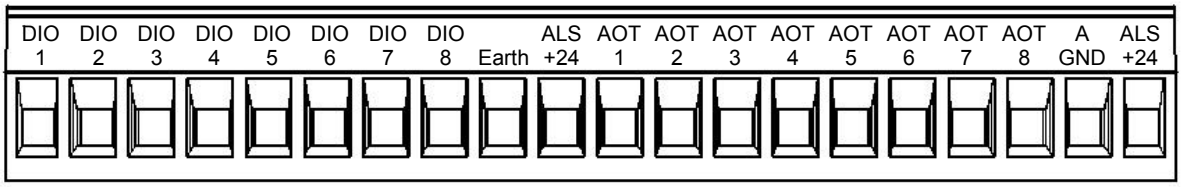

Figure 5-5: I/O terminal block for XYR 3013 I/O.

Pulse outputs coincide with DIO terminals 1-8.

The operation of the XYR 3013 I/O may be confirmed using the configuration software. Start the software as described in chapter 4, and choose the *AOT Check* page.

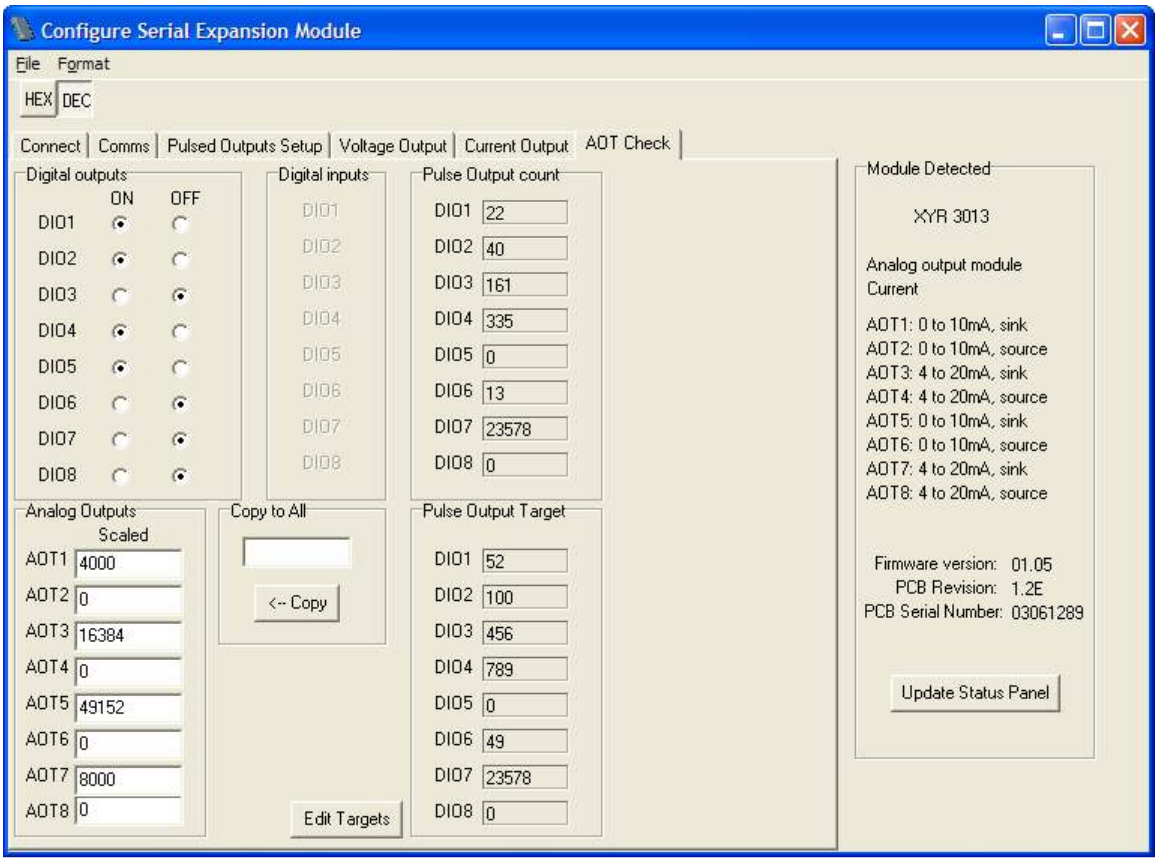

Figure 5-6: Check the operation of the XYR 3013 I/O module using the AOT Check page.

Test the digital outputs by setting the select-buttons to ON or OFF - this will force the DO to the selected state.

Digital inputs are reflected in the software by blacking (ON) or greying (OFF) of the associated label in the Digital Inputs column.

The pulse output count values are also shown. The pulse out target may be set by clicking the *Edit Targets* button. Pulses will be produced until the count reaches the target.

The analog outputs can be viewed in decimal or hexadecimal and represents a fraction of the analog signal, where hex 4000 is 0% and hex C000 is 100%.

The analog output values can be set by the user for testing, and the output signal measured to confirm the analog operation. If you are using hexadecimal values (which is the easiest) ensure the $ symbol precedes the value to denote a hex number.

5.4 Hexadecimal representation of voltage and current levels

The voltage and current levels are represented as a fraction of the configured scale. 4000 hex represents the minimum level in the scale, and C000 hex represents the maximum level in the scale.

Levels and their hex representation are summarized in Table 5-1 for easy reference.

			Voltage scale			Current scale		
Hex value	**Percent**	**Dec value**	**0-5V**	**0-10V**	**1-5V**	**0-10mA**	**0-20mA**	**4-20mA**
0000	0.00%	0	N/A	N/A	N/A	N/A	N/A	N/A
0800	3.13%	2048	N/A	N/A	N/A	N/A	N/A	N/A
1000	6.25%	4096	N/A	N/A	N/A	N/A	N/A	N/A
1800	9.38%	6144	N/A	N/A	N/A	N/A	N/A	N/A
2000	12.50%	8192	N/A	N/A	0.00	N/A	N/A	0.00
2800	15.63%	10240	N/A	N/A	0.25	N/A	N/A	1.00
3000	18.75%	12288	N/A	N/A	0.50	N/A	N/A	2.00
3800	21.88%	14336	N/A	N/A	0.75	N/A	N/A	3.00
4000	25.00%	16384	0.00	0.00	1.00	0.00	0.00	4.00
4800	28.13%	18432	0.31	0.63	1.25	0.63	1.25	5.00
5000	31.25%	20480	0.63	1.25	1.50	1.25	2.50	6.00
5800	34.38%	22528	0.94	1.88	1.75	1.88	3.75	7.00
6000	37.50%	24576	1.25	2.50	2.00	2.50	5.00	8.00
6800	40.63%	26624	1.56	3.13	2.25	3.13	6.25	9.00
7000	43.75%	28672	1.88	3.75	2.50	3.75	7.50	10.00
7800	46.88%	30720	2.19	4.38	2.75	4.38	8.75	11.00
8000	50.00%	32768	2.50	5.00	3.00	5.00	10.00	12.00
8800	53.13%	34816	2.81	5.63	3.25	5.63	11.25	13.00
9000	56.25%	36864	3.13	6.25	3.50	6.25	12.50	14.00
9800	59.38%	38912	3.44	6.88	3.75	6.88	13.75	15.00
A000	62.50%	40960	3.75	7.50	4.00	7.50	15.00	16.00
A800	65.63%	43008	4.06	8.13	4.25	8.13	16.25	17.00
B000	68.75%	45056	4.38	8.75	4.50	8.75	17.50	18.00
B800	71.88%	47104	4.69	9.38	4.75	9.38	18.75	19.00
C000	75.00%	49152	5.00	10.00	5.00	10.00	20.00	20.00
C800	78.13%	51200	5.31	10.63	5.25	10.63	21.25	21.00
D000	81.25%	53248	5.63	11.25	5.50	11.25	22.50	22.00
D800	84.38%	55296	5.94	11.88	5.75	11.88	23.75	23.00
E000	87.50%	57344	6.25	12.50	6.00	12.50	N/A	24.00
E800	90.63%	59392	6.56	13.13	6.25	13.13	N/A	N/A
F000	93.75%	61440	6.88	13.75	6.50	13.75	N/A	N/A

Table 5-1: Hex representation of voltage and current levels.

Appendix A. Modbus Address Map

A.1. XYR 3011 I/O

Data	Modbus I/O Type	Modbus Addresses
Digital input 1	Input status	10001
Digital input 2	Input status	10002
Digital input 3	Input status	10003
Digital input 4	Input status	10004
Digital input 5	Input status	10005
Digital input 6	Input status	10006
Digital input 7	Input status	10007
Digital input 8	Input status	10008
Digital input 9	Input status	10009
Digital input 10	Input status	10010
Digital input 11	Input status	10011
Digital input 12	Input status	10012
Digital input 13	Input status	10013
Digital input 14	Input status	10014
Digital input 15	Input status	10015
Digital input 16	Input status	10016
Digital output 1	Coil status	00001
Digital output 2	Coil status	00002
Digital output 3	Coil status	00003
Digital output 4	Coil status	00004
Digital output 5	Coil status	00005
Digital output 6	Coil status	00006
Digital output 7	Coil status	00007
Digital output 8	Coil status	00008
Digital output 9	Coil status	00009
Digital output 10	Coil status	00010
Digital output 11	Coil status	00011
Digital output 12	Coil status	00012
Digital output 13	Coil status	00013
Digital output 14	Coil status	00014
Digital output 15	Coil status	00015
Digital output 16	Coil status	00016
Pulse input count 1	Input registers	30017 – 30018
Pulse input count 2	Input registers	30019 – 30020
Pulse input count 3	Input registers	30021 – 30022
Pulse input count 4	Input registers	30023 – 30024
Pulse input rate 1	Input registers	30001
Pulse input rate 2	Input registers	30002
Pulse input rate 3	Input registers	30003
Pulse input rate 4	Input registers	30004
Maximum input pulse rate 1	Input registers	30101

Data	Modbus I/O Type	Modbus Addresses
Maximum input pulse rate 2	Input registers	30102
Maximum input pulse rate 3	Input registers	30103
Maximum input pulse rate 4	Input registers	30104
Pulse output count 1	Input registers	30009
Pulse output count 2	Input registers	30010
Pulse output count 3	Input registers	30011
Pulse output count 4	Input registers	30012
Pulse output count 5	Input registers	30013
Pulse output count 6	Input registers	30014
Pulse output count 7	Input registers	30015
Pulse output count 8	Input registers	30016
Pulse output target 1	Holding registers	40009
Pulse output target 2	Holding registers	40010
Pulse output target 3	Holding registers	40011
Pulse output target 4	Holding registers	40012
Pulse output target 5	Holding registers	40013
Pulse output target 6	Holding registers	40014
Pulse output target 7	Holding registers	40015
Pulse output target 8	Holding registers	40016
Pulse out update time 1	Input registers	30109
Pulse out update time 2	Input registers	30110
Pulse out update time 3	Input registers	30111
Pulse out update time 4	Input registers	30112
Pulse out update time 5	Input registers	30113
Pulse out update time 6	Input registers	30114
Pulse out update time 7	Input registers	30115
Pulse out update time 8	Input registers	30116
Module supply voltage*	Input registers	30033
Serial port transmission mode	Input registers	30201
Serial port baud rate	Input registers	30202
Serial port parity and stop bit	Input registers	30203

* 0x4000 = 8V; 0xC000 = 16V

A.2. XYR 3012 I/O

Data	Modbus I/O Type	Modbus Addresses
Digital input 1	Input status	10001
Digital input 2	Input status	10002
Digital input 3	Input status	10003
Digital input 4	Input status	10004
Digital input 5	Input status	10005
Digital input 6	Input status	10006
Digital input 7	Input status	10007
Digital input 8	Input status	10008
Digital output 1	Coil status	00001
Digital output 2	Coil status	00002
Digital output 3	Coil status	00003
Digital output 4	Coil status	00004
Digital output 5	Coil status	00005
Digital output 6	Coil status	00006
Digital output 7	Coil status	00007
Digital output 8	Coil status	00008
Pulse output count 1	Input registers	30009
Pulse output count 2	Input registers	30010
Pulse output count 3	Input registers	30011
Pulse output count 4	Input registers	30012
Pulse output count 5	Input registers	30013
Pulse output count 6	Input registers	30014
Pulse output count 7	Input registers	30015
Pulse output count 8	Input registers	30016
Pulse output target 1	Holding registers	40009
Pulse output target 2	Holding registers	40010
Pulse output target 3	Holding registers	40011
Pulse output target 4	Holding registers	40012
Pulse output target 5	Holding registers	40013
Pulse output target 6	Holding registers	40014
Pulse output target 7	Holding registers	40015
Pulse output target 8	Holding registers	40016
Pulse out update time 1	Input registers	30109
Pulse out update time 2	Input registers	30110
Pulse out update time 3	Input registers	30111
Pulse out update time 4	Input registers	30112
Pulse out update time 5	Input registers	30113
Pulse out update time 6	Input registers	30114
Pulse out update time 7	Input registers	30115
Pulse out update time 8	Input registers	30116
Analog inputs 1	Input registers	30001
Analog inputs 2	Input registers	30002
Analog inputs 3	Input registers	30003

Data	Modbus I/O Type	Modbus Addresses
Analog inputs 4	Input registers	30004
Analog inputs 5	Input registers	30005
Analog inputs 6	Input registers	30006
Analog inputs 7	Input registers	30007
Analog inputs 8	Input registers	30008
Module supply voltage*	Input registers	30033
Analog supply voltage (24V)+	Input registers	30034
Serial port transmission mode	Input registers	30201
Serial port baud rate	Input registers	30202
Serial port parity and stop bit	Input registers	30203

* 0x4000 = 8V; 0xC000 = 16V
+ 0x4000 =12V; 0xC000 = 36V

A.3. XYR 3013 I/O

Data	Modbus I/O Type	Modbus Addresses
Digital input 1	Input status	10001
Digital input 2	Input status	10002
Digital input 3	Input status	10003
Digital input 4	Input status	10004
Digital input 5	Input status	10005
Digital input 6	Input status	10006
Digital input 7	Input status	10007
Digital input 8	Input status	10008
Digital output 1	Coil status	00001
Digital output 2	Coil status	00002
Digital output 3	Coil status	00003
Digital output 4	Coil status	00004
Digital output 5	Coil status	00005
Digital output 6	Coil status	00006
Digital output 7	Coil status	00007
Digital output 8	Coil status	00008
Pulse output count 1	Input registers	30009
Pulse output count 2	Input registers	30010
Pulse output count 3	Input registers	30011
Pulse output count 4	Input registers	30012
Pulse output count 5	Input registers	30013
Pulse output count 6	Input registers	30014
Pulse output count 7	Input registers	30015
Pulse output count 8	Input registers	30016
Pulse output target 1	Holding registers	40009
Pulse output target 2	Holding registers	40010
Pulse output target 3	Holding registers	40011
Pulse output target 4	Holding registers	40012
Pulse output target 5	Holding registers	40013
Pulse output target 6	Holding registers	40014
Pulse output target 7	Holding registers	40015
Pulse output target 8	Holding registers	40016
Pulse out update time 1	Input registers	30109
Pulse out update time 2	Input registers	30110
Pulse out update time 3	Input registers	30111
Pulse out update time 4	Input registers	30112
Pulse out update time 5	Input registers	30113
Pulse out update time 6	Input registers	30114
Pulse out update time 7	Input registers	30115
Pulse out update time 8	Input registers	30116
Analog outputs 1	Holding registers	40001
Analog outputs 2	Holding registers	40002
Analog outputs 3	Holding registers	40003

Data	Modbus I/O Type	Modbus Addresses
Analog outputs 4	Holding registers	40004
Analog outputs 5	Holding registers	40005
Analog outputs 6	Holding registers	40006
Analog outputs 7	Holding registers	40007
Analog outputs 8	Holding registers	40008
Module supply voltage*	Input registers	30033
Analog supply voltage (28V) +	Input registers	30034
Serial port transmission mode	Input registers	30201
Serial port baud rate	Input registers	30202
Serial port parity and stop bit	Input registers	30203

* 0x4000 = 8V; 0xC000 = 16V

+ 0x4000 =12V; 0xC000 = 36V

Appendix B. Modbus Functionality

Table B-1 specifies the maximum query and response data parameters for the XYR 301X modules. See the Gould Modbus Protocol Reference guide (PI-MBUS 300 Rev B) for more detail.

Function code	Description	Maximum Data Size
1,2	Read coil / input status	1160 coils / inputs
3	Read holding (output) registers	145 registers
4	Read input registers	145 registers
5	Force single coil	1 coil
6	Set single register	1 register
7	Read exception status	8 coils
8	Loopback test	N/A
9,10	NOT SUPPORTED	NOT SUPPORTED
11	Communications event counter	N/A
12-14	NOT SUPPORTED	NOT SUPPORTED
15	Force multiple coils	1160 coils
16	Set multiple registers	145 registers
17-255	NOT SUPPORTED	NOT SUPPORTED

Table B-1: Supported Modbus functions and limitations for XYR 301X modules.

Appendix C. Comms Recovery

If the communications setting of the XYR 301X has been forgotten or mistakenly set, there is a way of recovering serial communications with the XYR 301X. XYR 301X firmware versions 1.04 and earlier require ModScan to do this. With later firmware versions, this can be done using the configuration software, cfg_Honeywell_Serial_x.xx.exe.

Procedure for recovering communications with recent firmware (V1.05 and later):

1. Set the Modbus address switches to 00. This fixes the communications setting to Modbus RTU, 9600 baud, no parity, and one stop bit.
2. Connect a standard (straight-through) RS232 cable to the module and the PC.
3. Start the configuration software, cfg_Honeywell_Serial_x.xx.exe.
4. Set the slave address to 100.
5. Ensure the comms settings are 9600 baud, no parity, one stop bit.
6. Click *Connect to XYR 301X*
7. The module should connect successfully.
8. Choose the Comms page and change the settings to the desired parameters.
9. If the module did not connect successfully, try the steps listed below for using ModScan.

Procedure for recovering communications with firmware V1.04 and earlier:

1. Set the Modbus address switches to 00. This fixes the communications setting to those specified in step 6.
2. Connect the RS232 port to the PC and start ModScan.
3. Supply power to the XYR 301X.
4. In ModScan, set the following
   - Address: 0201
   - Length: 3
   - Device ID: 100
   - Modbus Point Type: Holding register
5. Click Connection / Connect.
6. Choose the appropriate COM port. Also choose
   - Baud rate: 9600
   - Word length: 8
   - Parity: none
   - Stop bits: 1
7. Click Protocol Selection. Choose STANDARD ASCII for Transmission mode. Click OK, OK.
8. ModScan should connect to the module with no errors.
9. The registers displayed in ModScan represent the serial port settings that are used when the address switches are set to other than 00, as follows:

Address	Description
40201	Serial port transmission mode
40202	Serial port baud rate
40203	Serial port parity and stop bit

10. Use the tables below to work out the current communications settings, or write to the registers using ModScan to change the settings to the desired values. Note that the module transmission mode should be set to Modbus RTU.

    Modbus address 40201, serial port transmission mode:

Setting	Register Value
Modbus RTU	0x0101
Modbus ASCII, 8 data bits	0x0201
Modbus ASCII, 7 data bits	0x0202

    Modbus address 40202, serial port baud rate:

Setting	Register Value
1200	0x000C
2400	0x0018
4800	0x0030
9600	0x0060
14400	0x0090
19200	0x00C0
28800	0x0120
38400	0x0180
57600	0x0240
76800	0x0300
115200	0x0480

    Modbus address 40203, serial port parity and stop bit:

Parity Setting	Register's High Byte Value
None	0x00
Odd	0x11
Even	0x22

Stop-bit Setting	Register's Low Byte Value
1 stop bit	0x11
2 stop bits	0x22

11. Once the new comms setting are correct, be sure to change the address switches back to a non-zero setting for normal operation.

Specifications

EMC Approval	EN 55024:1998 EN 61000-3-2: 2002 EN 61000-3-3: 2002 EN 55022: 1998 FCC Part 15	
Operating temperature range	-40 to +45 deg C	
Power supply	10.8 – 15.6VDC 13.8V nom	
Supply current (quiescent @ 13.8V) -11 -12 -13	 100mA 100mA 120mA	
Additional supply current for I/O per digital input per digital output per analog input per analog output	 13mA 13mA 50mA 50mA	 If using 24V loop supply
Loop supply	24V	
Loop supply max current	270mA	
RS232 port	Modbus protocol	
RS485 port	Modbus protocol Honeywell E-Series protocol	
Modbus protocol		
Transmission modes	Modbus ASCII 8 data bits Modbus ASCII 7 data bits** Modbus RTU	**If no parity, use 2 stop bits. If using parity, use 1 stop bit.
Baud rates	1200; 2400; 4800; 9600; 14,400; 19,200; 28,800; 38,400; 57,600; 76,800; 115,200	
Parity	Odd, even, none	
Stop bits	1, 2	
Slave address	01 - 99	
Default settings	If slave address = 0	Modbus RTU, 9600, N, 1

Digital inputs		
On-state voltage	<2.1VDC	
Wetting current	5mA	
Max pulse input rate	1kHz	
Minimum pulse width	0.5mS	
Max pulse input count	4294967295 (32-bit)	
Digital outputs		
Output voltage range	0-30VDC	
Output current max	200mA	
Max pulse output rate	100Hz	
Max pulse output count	65535	
Analog Inputs		
Input voltage range	0-12V	
Voltage resolution	16 bits	
Input current range	0-24mA	
Current resolution	16 bits	
Input impedance (voltage)	100k	
Input impedance (current)	100ohm	
Common mode voltage range	27VDC	
Calibrated accuracy	0.10%	
Analog Outputs		
Output voltage range	0-12V	
Voltage resolution	12 bits	
Output current range	0-24mA	
Current resolution	12 bits	
Calibrated accuracy	0.10%	

Table D-1: XYR 301X Specifications.

XYR 301X	-11	-12	-13
Digital inputs/outputs	16	8	8
Pulse outputs	8	8	8
Pulse inputs	4	-	-
Analog inputs	-	8	-
Analog outputs	-	-	8

Table D-2: XYR 301X module types and I/O.

Appendix E. RS232 Wiring

The RS232 connection to the XYR 301X modules requires a standard straight-through serial cable (modem cable). The wiring is shown in Figure E-1.

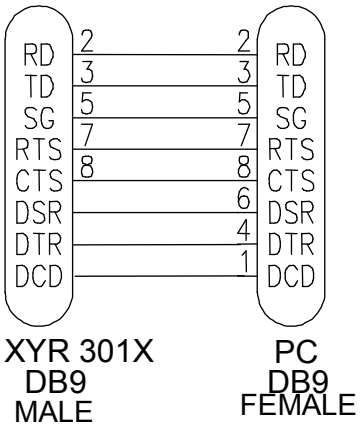

Figure E-1: Wiring for RS232 cable for PC-XYR 301X communications.